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**FERRANTI**

**NEWS IN BRIEF****Ghess \$50,000  
program offer**

A FRESH challenge has been issued to developers of chess-playing programs. Volmac, a software house in Utrecht, Holland, has offered \$50,000 to the designers of a program which can defeat grandmaster Professor Max Euwe, a former world champion.

The offer is open until January 1, 1984, and calls for the program to win more than two games out of a four-game match.

**Paris debut**

THE 8-bit bus version of the Intel 8088 16-bit micro, first previewed in Computer Weekly 15 months ago (Micro News, November 24, 1977), is due to make its debut at the Paris Salon des Composants next month. It is called the 8088.

**Security games**

A THREE-DAY study programme on computer security is to be held by consultant Adrin Norman in Eastbourne from March 12 to 14. Participants will be given the chance to put theory into practice by playing games of attack and defence on imaginary systems. The course is being run by European Study Conferences of Rutland.

**The Immos race**

THE race to have an Immos factory in their area is expected to have attracted about 100 local authority entries, covering a possible 200 sites, by the time the closing date for completed questionnaires is reached this week. Consultants PA International will be sifting the entries and the first Immos site is expected to be announced in April.

**Modcomp in talks**

NOW that Modcomp has lodged restated accounts for 1973 to 1978 with the US Securities & Exchange Commission, talks are set to resume with two large multinationals, believed to be Thorn and Northern Telecom.

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**Consultancy opportunities for computer clubs**

THERE is scope for computer clubs to subsidise their existence by doing consultancy and programming work for organisations wanting to get their own low cost systems running.

This emerged at the first meeting of SELMIC, the South East London Microcomputer Club, at South East London College last week, when a member, Mike Hutchings, said he knew of two organisations that were looking for help from amateurs.

Many amateurs are prevented by their employers from doing outside work, or are

bound by contracts requiring management checking of all outside work. But it was suggested they could collaborate with other club members on projects that would benefit the club as a whole.

At this first meeting they owned discovered that between them they owned 11 different types of microcomputer system, including Interall IM8100, Nascom, and Pats. The organisers hope that at least one of each type will be brought to the club's next meeting on Wednesday, March 21, at South East London College. Anyone wanting to

take along a machine should phone John Williamson on 01-850 4185.

There were members of several other clubs at the meeting, including the Amateur Computer Club, South East London, North Kent and Medway Towns Amateur Computer Clubs and North London Huddly Computer Club; also several members of the Radio Society of Great Britain, who are interested in getting on the air with a computer, possibly using one of the Oscar series of satellites put up for amateurs by NASA.

**Users seek code  
for installations**

A CODE of practice for quality assurance in computer acquisition and installation is one of the firm recommendations made in a draft report to the National Computer Users Forum by its standards working party. The NCUF discussed the report this week and will be taking it to the March 29/30 meeting in Brussels of the Conference of European Computer User Associations. CECUA was recognised late last year by the EEC Commission as the official representative organisation for computer users in Europe. (CW, December 7, 1978). The forum is the UK member of CECUA and is examining the whole area of standards on behalf of CECUA.

The code of practice is seen by the working party as more acceptable than a set of formal standards and it believes that testing and certification centres should be set up to ensure that such a code is adhered to.

The code would apply to quality assurance of the feasibility study, the system specification, procurement procedures, the production of the hardware by the manufacturer, and then testing, commissioning, acceptance, training, maintenance and the post-implementation review.

Another major recommendation in the report is that computer environment standards should be established so that accommodation can be designed to meet future as well as current requirements without major structural changes. The assumption is that computer suites last much longer than computer equipment.

The report also discusses in detail the progress made towards standardisation in three other areas—portability, data interchange and open systems interconnection, OSI. The report calls for greater pressure to be applied to the International Standards Organisation and CCITT to co-operate more closely in the development of OSI standards.

Meanwhile, the members of the steering committee that will guide the work of the Data

Communications Protocol Unit set up by the Department of Industry (CW, February 22), have been named by the DoI. Chairman of the committee is Morley Sage, director of computing services at Southampton University. Sage is also a member of the computing sector working group of the DoI's Computers, Systems and Electronics Requirements Board. Other members of the committee are Roland Roemer of the Computer Board network unit, Ron Clark of the Inter Bank Research Organisation, John Jervis of Pactal, Brian Taylor of DoI, Charles Portman of ICL, Derek Thames of the CCA and Frank Taylor of BSI. There will also be an assessor from the Post Office.

**Fault  
free  
AS/6**

This unfamiliar looking CPU is an Intel AS/6, the more powerful Japanese built alternative to the IBM 3032. As reported exclusively in Computer Weekly, the first organisation in the UK to install an AS/6 is the Co-operative Insurance Society in Manchester (CW, February 1). Donald Scott, the society's IT manager, soon here with the machine, says the reasons for the CIS decision to replace its 370/155 with an AS/6 rather than a 3032 include quicker delivery, the lower cost of a four megabyte AS/6 compared with a 3032 of the same size, the lower cost of upgrading, and the air cooling and built-in frequency conversion which make the AS/6 less costly to install.

Scott ran 12 hours of continuous tests under OS/MFT on the AS/6 and then disconnected the 155. In the six weeks since then, CIS has not had one fault with the AS/6. The machine is manufactured by Hitachi to Intel's specifications.

**MVS on Ite's answer to 4341**

IN an attempt to offer IBM users a system with a significant plus point over the highly price competitive IBM 4341, Ite has announced MVS support with its latest addition to the Advanced System series, the AS/3-5.

No UK prices have been announced yet for the AS/3-5, but US prices include \$800,000 for a standard two Megabyte AS/3-5 compared with \$245,000 for a two Megabyte 4341. For the extra cost the AS/3-5 customer gets up to 22% more performance than the 4341, and the capability to expand memory up to eight Megabyte compared with the four Megabyte maximum on the 4341.

However, Ite points out that the AS/3-5 equals the 370/158-3 in performance and that its extra power and memory capacity compared with the 4341 enable it to run MVS "comfortably". IBM does not support MVS on the 4341.

The AS/3-5 could be used as a less expensive alternative to the 3031 for MVS systems development and it comes with 3031

**Kissinger for GEC**

FORMER US Secretary of State Dr Henry Kissinger has been appointed an adviser to GEC, which hopes to benefit from his experience in international affairs.

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**Express  
technology  
deal with  
printers**

THERE will be no direct buying by journalists at Daily Express and other papers for at least five years according to an agreement reached between Express Newspapers and the National Graphical Association, a typesetters' union.

This is an agreement in principle rather than a final plan for computerised production at the Express and other newspapers, which has yet been agreed. The union's members have been consulted.

Management at the Express said the current battle around direct buying is not particularly serious, saying that their stories and more content are being put on line.

They say that direct input links to mainframes at the Express are being used to speed up the production of the paper.

The Times in making its Express membership

Express managers have been quoted as saying direct input required and often unsuccessful.

The case of property systems, according to the Express, seems never to have been resolved.

The Thomson Organisation stated that it is not prepared to sell any of the Times

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**Briefing  
Micro man for  
Bum schools**

BIRMINGHAM schools are to have a specialist electronic engineer to advise on putting together microprocessor kit and to evolve courses on microelectronics. He will join the existing Educational Computing Centre which comprises eight teachers who circulate around the schools giving software courses.

About 80 Birmingham schools have terminal links to mainframes at the Open University or the City Hall, but many are now requiring micro and for this they need hardware support. Physics courses are also including micro kits.

**\$10m theft charge**

A PLEA of guilty has been entered by Stanley Rifkin to charges of stealing electronically \$10.2 million from a California bank (CW, November 9, 1978). In exchange for the plea, the US government has agreed not to prosecute under another charge, of conspiring to steal \$50 million from Union Bank of Los Angeles.

**Access for users**

MATCHING IBM's new software support service on the 4300s (CW, February 15), NCR is to allow users access to software support data previously only available to NCR engineers. The service, via users' terminals, begins next year.

The Thomson Organisation stated that it is not prepared to sell any of the Times

CLINICAL data on Cornwall's children, maintained on the county's dual ICL 1904 system, encoded by a senior medical officer and processed in a format not decipherable by any but authorised health personnel, the area medical officer has assured the county council.

The move will have no effect on staff at the Frankfurt office, or upon our UK headquarters at Reading, European marketing vice-president Mel Bosch told Computer Weekly.

The world's No 1 manufacturer of line printers for the OEM market, Dataproducts invests 10% of its turnover, which was \$138 million in the year to

**Criminal records**

IN the wake of the controversy about police systems (CW, March 1), the Chief Constable of South Yorkshire, James Brown, has assured local councillors that a computer to be installed at police headquarters in Sheffield will only hold records of known criminals. The Home Office is making a grant towards the £800,000 cost of the system.

**China's fourth**

A FOURTH major order from China has gone to Univac. Worth \$24 million, it is for a 1100/11 system to be delivered later this year for research at the Research Institute of Petroleum Processing in Beijing.

**Mostek decision**

A DECISION is expected next week on which country Mostek will be setting its new European manufacturing plant. Both the British Development Authority and the Irish Development Authority have put proposals to the company, and the decision rests between these two.

**Tory shadow over Immos and Insac**

WITH a General Election imminent, the stated plan of the Tory Party to sell off investments of the National Enterprise Board, should they be returned to office, is throwing a shadow over such operations as Immos, Insac, and Nexus before they have had a chance to get off the ground.

The Conservative Party, according to Sir Keith Joseph (CW, April 27, 1978), is keen to abolish the board, or at least reduce it to the status of a holding company. Its prime role then would appear to be looking after "lame duck" companies.

The board's investments would be sold off if buyers could be found, including 24% of ICL and 50% of Ferranti. These two holdings would probably be the first to go in any

future Tory administration, the proceeds providing some finance for other activities. But as Tory policy will probably include reducing the board's borrowing capacity, it seems unlikely that it will be able to continue with all its current investments.

The threat of such a move would be particularly harmful to Immos, the board's microelectronics venture, which is still in the start-up phase. Its plans include the production of a 64K RAM in the US, which is due to start in about a year's time, and the development of new range of single-chip microcomputers. These will be manufactured in the UK, but production is not scheduled to start until early 1981.

With the present government obliged to

call an election by October at the latest, Tory plans for the NEB could be crucial to the survival of Immos.

A spokesman for the Centre for Policy Studies, the Tory think tank on future policy, said this week that much would depend on the nature of the contract between the NEB and Immos as to whether the company would come up for sale.

Though it would not have top priority with a new Tory government, the spokesman indicated that sales of NEB investments might be expected within six months of the party coming to power. Last year, Sir Keith indicated that sales would be made after individual company affairs "had been put in order".

**US companies  
stop credit  
for Iran**

IN the wake of the troubles in Iran, some US companies have taken preventative action to stop banks honouring letters of credit from the former government.

AT&T has won a temporary restraint against the US bank, Manufacturers Hanover, regarding a \$30.2 million letter of credit. The company was involved in the administration, consultation and training work for the installation of a nationwide telecommunications network.

Two other companies working on the project are General Telephone and Electronics and Harris, which were designing and installing switching equipment for the network and providing military communications hardware, respectively.

US firms plan to go back — page 17

**Dataproducts moves Euro  
marketing HQ to London**

HITHERTO located in Frankfurt, the European marketing headquarters of printer and core memory manufacturer Dataproducts are to be moved to London.

The move will have no effect on staff at the Frankfurt office, or upon our UK headquarters at Reading, European marketing vice-president Mel Bosch told Computer Weekly.

The world's No 1 manufacturer of line printers for the OEM market, Dataproducts invests 10% of its turnover, which was \$138 million in the year to

● Turn to page 2

**INSIDE THIS WEEK'S CW.....****UNNECESSARY LAWS**

"Nonsense" is a word frequently used in the industry to describe proposed privacy laws, asserts Roy Johnston, who gives a personal view of why such laws are not only unnecessary but potentially harmful.

**LEASING DILEMMA**

With the dramatic fall in the cost and value of IBM mainframes a big question mark hangs over the future of the leasing industry that offers operating leases. Perry Mitchell, president of the European Computer Leasing Association, talks to



Bosch... "Our aim is to offer a complete line from 60 cps to 2,000 lpm."

**INSIDE THIS WEEK'S CW.....****UNNECESSARY LAWS**

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**Bradford WP  
agreement**

STAFF troubles at Bradford City Council over plans to extend word processing have been calmed by a plan for a joint management-union committee to guide developments. A three-week-old strike by typists in one department in protest against a work study, has been called off.

The joint steering committee will comprise three elected members of the council, three officers, and three officials of Nalgo, the union involved. Its aims are to study the new technology and its effects on staffing and grading, the sharing of benefits, and the redeployment of displaced staff.

The union had wanted an agreement that existing magnetic card word processors would only be replaced one-for-one, with no change in manpower requirements, but has now dropped this claim.

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**NCR offers  
rivals to  
the 4300**

THE revitalised NCR has responded to IBM's 4300 series with four new models in its 8500 line offering major price-performance improvements, and available for delivery in the US in April. It is also the first US mainframe to respond to IBM's new software support plans with a similar service of its own, and is following IBM with separate pricing of some operating software.

The new models replace the original Criterion 8500s introduced three years ago (CW, April 29, 1976) and unlike the machines they replace, are all offered in multiprocessor configurations of up to four CPUs.

The top machine, designated the V8555M, is claimed to offer 15% more power at a price about 20% lower than that of the V8550. One processor with two Megabytes of main memory costs \$375,000 in the US. The other models, which range from \$225,000 to \$83,000, are the V8575M, V8565M and V8555M.

IBM has announced that its new machines are claimed to offer 1.5 times the throughput of a single-processor version.

There is also a new model in the 8400 line, based on the same 16-bit processor which is used to front-end the 8500s. Called the V8455, it costs \$50,000 for a 512K-byte system.

Memory prices on the existing models have also been cut. One Megabyte of main memory for the V8570 is down from \$82,000 to \$46,000, which is much cheaper than the \$70,000 per Megabyte on the IBM 3030 series, but much more expensive than the \$15,000 per Megabyte on the IBM 4300 line.

Among those forecasting the IBM move was Gideon Gartner of New York brokers Oppen-

...the companies we keep



## COMPUTER WEEKLY

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## COMPUTERVIEW

Counting  
the cost  
of a strike

SO, ushered in with the dawn of the age of information technology is an awareness of the strategic role of the computer, which is rapidly becoming a central feature in all business activities — in industry, commerce and above all in central and local government.

If data processing is disrupted for any reason, then the cost can be high, in terms of lost orders, delayed payments, human hardship and even perhaps a threat to national security.

Whenever a computer system goes down the costs of failure are not simply limited to those of repair. Lost processing time means delays, rescheduling of work and increased risk of error, and possibly revenue lost forever.

We saw in last week's Computer Weekly the first major use of the computer as a powerful bargaining weapon by the two largest civil servants unions, the Civil and Public Servants Association and the Society of Civil and Public Servants.

All government departments use the computer extensively, and a lengthy dispute by various operations staff could swiftly and effectively cripple the country, as described by Ken Thomas.

The police would not be able to check stolen cars, VAT, National Savings, Social Security — the list is a long one, the effects widespread.

The sole concession made by

the CPSA and the SCPS in the current dispute is to allow the UK-US hot line to remain in operation. The basis of the claim is that the salaries paid to computer personnel employed by government are lower than DP salaries in industry. Indeed, there is a difference in salary levels which makes it difficult to recruit and retain DP staff, particularly the younger ones. This difficulty is exacerbated by the seemingly insatiable demand for computer personnel in this private sector.

In a democracy, the right of a man to withhold his labour is fundamental. However, striking should be the last action taken, particularly if livelihoods and perhaps even lives are threatened, including those of fellow trade unionists.

A code of "moral practice" in industrial relations is called for,

requiring both the employer and trade union to carry out a "strike audit". This audit would count the cost of a dispute, as far as possible, in terms of lost profits, inconvenience, loss of pay and effects on other companies not directly involved in the dispute, as well, of course, as the cost of meeting the union's claims.

We tend to think of strikes by a skilled workforce as being a recent phenomenon. However, in 1871, 9,000 Newcastle engineers were on strike for a reduction in their working day from ten hours to nine hours for the same wage.

But the importance of the computer does not end here. Many large users are caught in a usage trap and have in many cases passed the point of no return. Over the years the widespread use of the computer

has resulted in substantial changes in the organisation of company and government methods. To revert to a manual system would be an extremely expensive, lengthy and laborious process, impossible in some cases.

The costs of changing are prohibitive — a road that few would wish to travel back along. Frequently, the full potential of a computer system is neither understood nor exploited. If a system is fully used then other issues such as privacy (if, and when, UK legislation is introduced) and security (to ensure the system is not misused) become important.

All these in DP face a rising tide of machines, each day becoming faster, smaller and more capable, handling most of the affairs of man. However, as recent events have shown, computer power is no longer just the technology.

We must carefully and urgently assess the role and position of the computer in today's society so that we ensure that we reap the benefits and not the whirlwind.

## Ten years ago...

COMPUTER WEEKLY

MARCH 8, 1969

A DOUBLING of turnover by its Scottish bureau in each of the past two years was the aim of ICL managing director Alton Gilmore when he spoke at the formal opening of its Glasgow bureau which is equipped with an ICL 1903.

Systems house Logica was set up by two ex-Scottish men, Philip Hughes and Len Taylor, with a view to specialising in turnkey systems.

The first step towards an online real time accounting system for its London office was taken by the Swiss Bank Corp when it placed a £250,000

order for an ICL 4/40, a system for measuring bank response via Interdata General Electric in the US led the SRS 1000, a vast culmination of two years' research at Syracuse.

A Software Bank, Brown, DP managed the Polaris, said that the PL/I to work on the 3000.

A program which from CAP Europe for its efficiency at programs shown to provide better results of between 15% and 35%.

## Wilkes

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March 1978, on recent development.

"Even with that aspect, we cannot offer a full service, so you could say we are in buying mode," Bosch.

"We are doing research on several technologies, such as laser and xerography, and possibly also laser already produce their own matrix printers, and we added a band printer. Our offer a complete line of chips to 2,000 lines."

"We are targeting a growth of 25% per annum in Europe in the coming year," said Bosch. "The European customer base, CTL, Nixdorf, Siemens, Honeywell, in the area of December turnover was 18% at \$118 million, with a target for the full year."

## International Nascom Club gets under way

THREE Nascom users, Dave Hunt, Richard Beale and Howard Birkett, have agreed to run the International Nascom Microcomputer Club with the company's backing. The INMC was set up by Nascom to help users to exchange programs and tips.

Hunt, as manager of Henrys Radio in London, is a Nascom dealer and he also designed the graphics board and EPROM programmer that Nascom sales director Korr Barland says should be available in

volume production in April. Beale adapted Tiny Basic and several games for Nascom 1 from listings published in US hobbyist magazines, and Birkett has also adapted several well-known games, some of which are sold on cassette through Henrys.

This team aims to start by testing programs sent to the INMC by users and exchanging them according to whether they are

debugged and documented, seem to do something interesting, or need help from others before they will run properly. Lists of programs with titles, descriptions, categories and how to contact the author would then be circulated to members, as that they would have some idea of what they would get for their copying and postage fee.

Barland said that the 1978 INMC membership fee would also cover 1979, to compensate for the lack of activity last year.

GSI challenge to ADP's  
Onsite with IBM 4300s

IN-HOUSE mainframe processing facilities for time sharing users similar in concept to the Onsite service introduced to Europe last year by Automatic Data Processing are to be launched later this year by the GSI Group. Low-cost IBM 4300 series machines will be included in the mainframe kit offered to customers for use in-house.

GSI is the massive Paris-based bureau group, Générale de Service Informatique, which bought the UK's CRC Group in 1977, retaining GSI UK.

GSI will offer the in-house systems to bigger users of Cybernet. Finishing, the long-established CRC division whose services are now sold throughout Europe by GSI. The intention is to complement the existing time sharing services by enabling users to run in-house systems that are currently handled by Cybernet's Signis 9 installation at Slough.

With its Onsite service ADP offers its users the low-cost Digital Equipment 2020 mainframe which provides total soft-

ware compatibility with ADP's DEC System 10 time sharing mainframes. With its competing service GSI will not be able to offer Sigma compatible machines, but has decided to provide its customers with a choice between DEC 2020 and IBM 4300 computers.

Several new men in the GSI UK marketing operation used to work for ADP, including Paul Rolf, former boss of ADP in Belgium, who is now time sharing division director in the UK.

No details are available yet from GSI on the software that will be available for in-house running to customers of its new service.

GSI sees the new service gradually taking the workload off its three Sigma 9s and no new applications are being developed to run specifically on the Signis. The machines have been maintained by Honeywell since it took over the RXDS customer base, and the maintenance contract with Honeywell runs until 1983.

## Biggest in Europe

GSI is now the biggest European-based service bureau organisation, having chalked up a turnover of £92 million in 1978. The GSI Group's marketing manager, Patrick Gordon, a Frenchman despite his British-sounding name, says that £92 million is a record for 1978.

GSI has expanded mainly by acquisition, its last big buy being the French bureau, Natel, which it took over last year. GSI has powerful backers, being 55% owned by the French electrical giant, CGE, and 24% each by two banks — Societe

Generale and Credit Commercial de France. The GSI Group now has 40 big mainframes dotted around Europe, and 7,000 customers.

GSI UK, formerly CRC, will be provided with £1 million this year to buy new hardware and take on new marketing staff.

While the time sharing and market research services developed by CRC are now being sold on the Continent by GSI, GSI UK is starting to market here such GSI services as the International Dealer System, IDS, for automotive dealers.

Prestel users' doubts on  
editing terminals

MANY Prestel information providers will be disappointed with their intelligent editing terminals, because their capabilities are not very different from those of the basic editing keyboard provided by the Post Office.

This is the view of Richard Griffiths whose company, Network Data, uses the bulk editing service offered to Prestel information providers by Blue Circle Cement data processing bureau, based on its IBM 370/158 at Bromley, Kent.

"Intelligent editing terminals will tie us to the Prestel format for entering information. And cross-references must be entered individually which is a very time-consuming process," said Griffiths at a presentation of the service to information providers.

"Using bulk editing, we can update 2,500 addresses from estate agents on our com-

mercial property advertising pages, but we could take on 10,000 in the next week and get them all loaded in the correct structure with no increase in staff."

Blue Circle systems programmer David Monkhouse added that another bulk editing client, What Car magazine, had an average seven cross-references on each of 800 pages, a total of 4200 for which frequent manual updates would be a nightmare.

Surprisingly little interest had been shown in the possibility of the Post Office offering a high speed synchronous link to the Prestel database, Monkhouse said. But this facility would not only allow bulk updating directly from an IP's computer without the intermediate stage of recording on a tape, but would also allow future developments such as alphabetic searching through the whole database by a user's computer.

## Modata

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To mark his retirement from the editorship of Computer Weekly, and in recognition of all that he has done to make known the work of the BCS Specialist Groups, Melcolm Potts last Thursday was presented by Alan Sutcliffe, chairman of the Specialist Groups Committee, with two books "The Exhibition of 1981" and "The Bridgewater Treatise." Representatives of many of the 40 BCS Specialist Groups attended the presentation at BCS headquarters.

## IEE honours Intel founder

THE Institution of Electrical Engineers' highest award, the Faraday Medal, is being awarded today (Thursday) to Dr Robert Noyce, chairman and co-founder of Intel.

The award is made annually to an individual who has produced notable scientific or in-

dustrial achievements in electrical engineering during the year.

Industrially, Intel's achievements are considerable, the corporation having increased its turnover during 1978 by 42% to over \$400 million. Earnings were also increased by 40% to \$44.3m.

Ten  
years  
ago...

...Logica was formed Computer Weekly reported the event on the front page. Thank you Computer Weekly and thank you for ten years of reporting. Your consistent high standards have greatly benefited the computing industry.

These ten years have seen a transformation of the software industry — in scale, in range and above all in importance. It is at last widely recognized that the software industry has an importance far greater than just its size would imply.

Throughout these ten years Logica has set industry trends in turnkey supply, delivering mini computer based systems from 1970 onwards. In hardware, delivering custom designed and manufactured electronics over eight years ago, and establishing a factory six years ago. In computer networking, installing packet switching networks throughout the 1970s. In word processing, supplying to Unilever four years ago.

European first in shared logic systems. In micro-processors, first incorporating them into client applications over three years ago.

Logica has also set trends in international operations. Major operating companies have been built up in Benelux, Sweden, Australia and now the USA. The partnership with SESA in France started eight years ago has set an example in European co-operation. Major projects working together include the applications software for handling Meteosat, the implementation of Europe's two multi-national networks ESN and Euronet, and for 17 European PTs the Eurodata 79 study.

Logica continues its policy of working today in technologies the company believes will be vital tomorrow. Examples include the electronic office, with the establishment of the sister company, Logica VTS, to exploit the lead in word

processing. And in Teletext with major projects and commitments to CEEFAX and Prestel.

The 1980s will be characterized by information processing impacting the office, the shop and the home. Just as Logica has contributed to, and in some fields led, developments during its first decade, so it will aim to lead during the next ten years.

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NCC

seminar

## WHAT NEXT IN THE OFFICE?

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on 24 April, 1979

The office revolution, brought about by computers, has now begun and is accelerating. Routine work carried out by typists, filing clerks, post and print rooms will be integrated into electronic office systems using word processors, video terminals, telephone networks and data storage media.

This seminar describes what equipment is now available, looks at the short term prospects for both large and small organisations, considers the human problems involved and discusses one company's approach to office automation.

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## 1984 and all that . . . .

CONTRIBUTIONS from readers are welcome for our column of the funny things people say in the media about computers. We will pay £5 for each item we publish.

The new IBM processor can store four million pieces of information.

Photo caption in the New York Times.

The Computer with the largest memory built in the United Kingdom is the International Business Machines 1984 which is a multiprogramming computer with 16,777,216 bytes of main storage.

Official Book of Records, 1978



# Downtime

## Ancient and/or Modern I

SEEING that my colleague Rory Johnston is going on about privacy in the next column, I thought I would point out to him that the idea of a Data Protection Authority is not new. It was in the seventeenth century that Henry Vaughan wrote a hymn (A&M 286) on the subject:

My soul, there is a country  
For beyond the stars,  
Where all things are  
in winged entry  
All skillful in the wars:  
There, above noise and  
dunger,  
Sweet peace sits  
crowned with smiles,  
And one horn in a manger  
Commands the  
beauteous files.

That's one way (the only way?) of making sure the DPA is impartial and omniscient!

## Ancient and/or Modern II

THOSE of you involved in the export side of our business will be pleased to hear that the British Overseas Trade Board is supporting promotions of our products all around the world. One of these will tour Tokyo and other major Japanese cities, and as the Board describes it, "With the theme of Queen Victoria, this year's exhibition will present a picture of 19th century Britain through a variety of valuable and genuine exhibits." Isn't it nice that our image as modern leaders in the advanced technology stakes is being so carefully nurtured?

AM I getting paranoid about our green and pleasant land being secretly taken over by those inscrutable Japanese? Or have my eagle eyes detected the first sign of the invasion of British industry by diminutive Oriental? Market Report in the Financial Times the other day referred to one of our most important computer and communications firms as "Praseasy". To arms, Captain Mainwaring!

# Data protection laws: The real threat

THE other day I was talking to the systems development manager of a large corporation, and among other things I asked him what his views were on privacy. "I'm afraid," he replied, "I have a very low threshold of boredom on that particular subject."

This is a widespread feeling among computer professionals, who for years now have been listening to the same arguments grinding on, the same vague, hypothetical worries, the same woolly thinking, with little sign of the debate ever coming to an end.

I think, however, that this apathy is unfortunate, simply because there is so much ignorance and confusion surrounding the debate, and it is informed, concerned computer people who are best able to demonstrate the practical implications of these issues. I am convinced that the proposed data protection controls are not only unnecessary but potentially very harmful to our system of laws and, indeed, to our civil liberties and even our privacy.

Fear of the unknown is clearly behind much of the public's apprehension of computers and files.

Several distinguished figures in the computer profession, including past presidents of the BCS, have publicly taken the view that although the fears are nonsense, we need to pass data protection laws in order to allay these fears. I disagree strongly with this — the law is far too important to play around with in this way, and if there is a problem it is vital that we attack it from the right direction — by education.

I do not take the view that privacy does not matter — far from it. But the protection measures taken must be commensurate with the size of the problem, and we must not try to strengthen our human right by walking all over other rights. Later in this article I explain why I think the privacy campaigners are tilting at windmills, and why data protection regulations pose a threat to our liberties and the rule of law. This can only be a cursory review of a highly complex subject, but I hope it will stimulate more thought and discussion of a viewpoint that has had little exposure in the past.

Of immediate importance is that informed computer professionals turn their minds to the practicality of the Data Protection Committee's proposals. A long series of questions about the details of the proposals was raised at the NCCL's conference in January. I will pick out a few of the most crucial ones.

The first concerns the propo-

sal that provokes the most jocular comment from computer people. In order to enforce codes of practice, the Data Protection Authority's investigators would be empowered "to enter the premises of any user (and) examine his systems". One almost imagines that the Committee envisaged an inspector lifting the lid of a box and peering inside.

Any programmer knows how difficult it is to understand a program of any complexity written by someone else, even when the author intended it to be understandable. If instead the author is deliberately trying to conceal what he is doing, the possibilities are endless — code which overwrites itself, moves about in memory, and so on. Thus, willing co-operation on the part of the system operator will be required. But it would be very wrong if lack of willingness to co-operate could be taken as

"What have you got on me?" Virtual databases, which are now on the horizon, pose similar problems, yet neither of these types of file was mentioned in the DPC recommendations.

The scale of the regulatory exercise is also a complete unknown: it is suggested that, with the proliferation of microcomputers, in a few years there will be far too many applications to control. If only a fraction of applications are controlled, there is no reason to believe that there could be nothing going on in the uncontrolled sector to cause concern.

The outcome of all this is that it is no way clear that the Data Protection regulations will have the desired effect. Many people in the industry feel that the only people they will affect are the honest; anyone who is determined to evade them will succeed.

Sir Norman Lindop, chairman



## By Rory Johnston

Data protection laws are unnecessary, unworkable, and wrong in principle, argues RORY JOHNSTON, calling on computer professionals to campaign for a more sensible, less alarmist approach to the subject of privacy.

evidence of guilt. Also, there is an ancient principle in law that people cannot be compelled to incriminate themselves.

The National Computing Centre is embarking on a study of how such "privacy audits" could be carried out. However, to me it is clear that the only way they could be made practical is by imposing severe restrictions on the way systems are designed in the first place. In order to make them comprehensible to outsiders. This will obviously impede technical progress, as well as being itself an infringement of liberty not only of companies, but also of the growing number of individuals who own computers.

Other problems concern the right of subject access to files. In some circumstances an individual would have the right to demand a printout of the entry about him on a file, but it would be a trivial piece of programming to cause sensitive parts of the record to be omitted on output. Complex relational databases make it very difficult to answer completely the question,

of the DPC, speaking at the NCCL conference, admitted: "You can't legislate against the bent operator."

To me, there is no point in having a law which cannot catch crooks. Given that the solution is unworkable, is there really a problem? The most telling answer to this comes from the DPC themselves. Neither they, nor the Younger Committee before them, nor the US Privacy Commission, were able to find one single significant example of infringement of privacy by computer, over the course of several years' study. "We are in danger of legislating against witchcraft," was how one delegate put it at a recent conference.

Of course it is possible to misuse a computer, just as it is possible to misuse anything. But it is a mistake to imagine that we need a new structure of laws to deal with the harm to individuals that can be done using a computer. For instance, if someone passes untrue and harmful information about someone else to a third party

using a computer, that is libel, just as much as if a conventional medium had been used, and the culprit can be sued for substantial damages.

Certainly the laws on defamation could be improved and made easier to use (it should, perhaps, be possible to get legal aid to sue for defamation) but the principle behind them is sound.

Privacy can also be protected by contract. If my bank manager were to let out information about my account, I could sue him for breach of our (implied) contract.

Concern has been expressed about files held by the police, many of which contain "intelligence", which by its very nature is gossip and speculation. This does not worry me. The whole point of our courts system is that the police can suspect me as much as they like, but they still cannot prosecute me without evidence, as opposed to gossip. If that system is not working fairly, as some Civil Liberties people claim, then that is the problem we must tackle; it still makes no sense to try to control what the police think, rather than what they do.

There are large numbers of personal files held in the public sector, social workers' records, for instance, which must naturally be protected from unauthorised access. Therefore it behooves us to make sure, through pressure on our elected representatives, that adequate security measures are taken.

As record-keeping systems get more complex, it might well be a good idea for the government to have a specialist security inspectorate to oversee this. However, it is essential that regulations imposed on civil servants make sense.

For instance, it is not practicable for every piece of paper they write on during the course of their work to be open to public scrutiny. Therefore public access must be limited to certain specified files, and it will always be possible for an official to keep information off these files if he chooses. Laws are no substitute for effective managerial control.

Mailing lists are a topic often raised by the data protection lobby. Is it an invasion of privacy to send someone a letter he did not ask for? After much solemn deliberation both the UK and US committees decided it is not. If you get a letter you do not want, you drop it in a waste bin, and the council will take it away free.

This whole topic, the fallacy of the "conventional wisdom" on privacy, is dealt with in detail and with fascinating insight in a chapter in law-lecturer Colin Tappin's latest book. I recom-

mend it to those interested in looking into this in greater depth than I have room for here.

The final basic issue to be considered is that of moral rights. It is vital that laws are sound principles behind them, otherwise we are well on the road to tyranny. Are there any principles behind the data privacy laws?

I have a right to sit in a privacy of my home, write things on pieces of paper, have a right to write things about you, and I am committing no offence or infringing your privacy. It has no effect on what I do with a pen, or a typewriter, or a word processor, or a 370/143. You have no right to break into my home and rummage around to see what I have written anything about you; that would not be an infringement of privacy.

On the other hand, if I write something about you that is true and defamatory, and I pass it to someone else, I have defamed you, and you can sue for damages. But the police cannot pass on to someone else what I have written about you.

In the case of public files, we can impose regulations on the servants regarding the operation of their records, and we can make sure that they do what we want, and how they control it, more such arbitrary regulations we have, the more we weaken the rule of law, which I have convinced is the only protection we have for our liberty. Data protection laws are also harmful to the system.

The last thing we need is other Quangos, and not just Quangos, but a Superquango with unprecedented powers to do a task which, if it can be done at all, will seriously encroach on our working time. It is only on our working time that our lives outside the office are lived.

When the motor car was introduced, there was a period which required that each car be preceded by a man waving a flag. That law was a well-meaning but stupid attempt to deal with a new technology. It was replaced by a more intelligent, well-substantiated law, which required that each car be preceded by a man waving a flag. That law was a well-meaning but stupid attempt to deal with a new technology. It was replaced by a more intelligent, well-substantiated law, which required that each car be preceded by a man waving a flag.

Computer Law, by Colin Tappin, 1978, Butterworths, 50p.

## New industry training scheme unnecessary, says poly director

IT would be "re-inventing the wheel" to set up a new national scheme for training for the computer industry as proposed by the Noddy Computer Sector Working Party (CW, March 1). That is the view of Norbert Singer, director of Thames Polytechnic, who strongly criticised the Working Party as having failed to recognise that there is already a national scheme based around the polytechnics and universities.

There is no need, Singer told Computer Weekly, for a new organisation in addition to the Business and Technician Education Councils and the Council for National Academic Awards. What was urgently needed, he said, was for more money to be pumped into the existing activities in polys and universities so that they could expand their capacity to meet the demand.

Singer also criticised the Working Party for saying that there was considerable spare capacity in all forms of computer education. "This was not true at all in the polys, he said, where there was a 'massive demand' for places on computer courses.

However, he said, given extra resources, the polys were perfectly capable of meeting industry's need for computer staff. Money was first of all needed for extra equipment, he said. In addition, to keep students up to date with the latest technology in a fast-changing field it was vital to get experienced people into teaching on secondment from industry. As these would be highly-paid people, special grants would be needed to make such secondment feasible.

Industry needed to provide more places on sandwich courses as well, Singer said, and he affirmed that graduates of these courses were among the most useful and therefore most valuable to industry.

There is a problem with sandwich courses in the Civil Services though, in that students on these courses are counted as part of a department's manpower complement, so there is a disincentive to have them.

The polytechnics were particularly involved in industry and aware of industry's needs, Singer felt, and what was needed was not a new scheme but money to provide more of the same.

According to the Universities Central Council on Admissions, applications for computing courses continue to run at 51% above last year.



## Devastating effect of micros on industry

A FIVE-DAY conference aimed at providing a state of the art review of computing is to be held from March 26-30. Called the European Computing Review, the conference, organised by Infotech International, is expected to attract up to 800 senior practitioners.

During the five days nearly 100 speakers will cover databases, software development aids, DP management, data communications and technology and several other topics. A key part of the event will be a detailed examination of data communications over the next five years.

Peter Walker, MP, former Tory minister for industry, will speak on politics and computing. In line with

government ministers, Walker believes that technology by itself is likely to mean that far fewer people will be needed in the industries of the high industrial countries of the Western world by the mid-1980s. "But," he added, "some 100 million additional people are likely to be employed in industrial production in developing countries and they will have the vicious combination of up-to-date technology with the lowest costs of production — a combination which will have a devastating effect on the existing industrial countries including Britain."

Further details and bookings can be obtained from Karen McKenzie, on 0628 35031, telex 847319.

## Conversion aid could open new market for ICL

THE success of Direct Machine Environment as a conversion aid for ICL 1900 and System 4 users, highlighted at the recent 2900 Club meeting (CW, March 1), raises the possibility that ICL will use this route to win customers from its major competitors, in particular IBM, Siemens and Univac.

Available on the 2950, 2955 and 2960 processors, the various DME emulations minimise the pain of migrating from 1900 and System 4 mainframes to the completely incompatible 2900 line.

They enable users to run their existing workloads unchanged under DME while they develop new systems and carry out conversion under the native 2900 VME/B and VME/K operating systems. Some users have found DME so agreeable that they have postponed conversion to VME indefinitely.

It would be comparatively easy for ICL to do DME emulations for the Siemens BS2000 and Univac VS/9 operating systems, since both are descendants of the original RCA Spectra 70 hardware and software on which System 4 was based.

In addition, no manufacturer can ignore the enormous IBM 370 base, which dictates that ICL should offer a DME/370 if it decides to follow the compatibility route to win competitive sales.

ICL is likely to devote most of its energies for another year or so to persuading the remainder of the still large base of 1900 users and the much smaller System 4 base to migrate to 2900, and to improving VME/B to the point where it lives up to all the

claims made for it.

After that, ICL will need to generate a growing proportion of its business from new users, and a strong conversion facility like DME coupled with VME/B, which can justifiably be claimed to be the most modern operating system apart from NCR's VRX, would make for a persuasive sales argument.

Commenting on the

possibility of DME for competitors' machines, ICL said that it was doing a lot of work to ensure an increasing share of the market, including gains from competitors. Growth in continental Europe was high and would continue.

"We are constantly reviewing our product strategy to meet our growth objectives. DME for competitors' machines is an interesting concept, but we have no comment to make on it," the company said.

In the view of consultant Fred Lamond, it would be morally difficult for ICL to take this path. "They scream so loud when anybody else provides emulation facilities for ICL operating systems that it would be a big about-face to start doing it to other companies," he said.

## Level 61 meeting

HONEYWELL Level 61 users are meeting at 11.00 am on Thursday, April 5, at the Coventry Novotel in Coventry to appoint a new chairman.

The group complained to Honeywell last year about having to upgrade to a Level 62 if they want more capacity, while Continental users are offered bigger Level 61 models (CW, November 8, 1978).

## Elliott replacement

A REPLACEMENT for the ageing dual Elliott 4130 system at University College, Aberystwyth is to be chosen this month.

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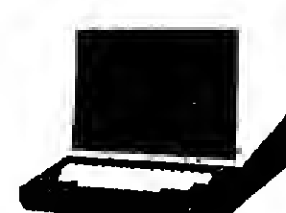
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to 19,200 Baud  
Dual Interface - CCITT V24  
and 20/80 mA Current Loop  
Teletype Compatible  
Hard Copy Printer Output  
Selectable Half or Full Duplex  
Video Output for External Moni-  
tors  
Green Phosphor Non-glare  
screen



Model 7000

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## MICHIE'S PRIVATEVIEW

### Special boxes for special tricks



EARLIER mentioned colour vision as a case where the basis of a cognitive activity is "hard-wired" in the neuro-anatomy of eye and brain (CW, November 23, 1978).

Language is another human behaviour where the strategy of "special boxes for special tricks" has been followed by biological evolution.

Investigators were at first confused by the clinical effects of brain injury on the ability to speak. This ability is lost as a result of damage anywhere in quite extensive regions of the cortex (outer layer) of the left half of the brain.

It seemed that the function must somehow be diffusely represented.

More detailed analysis has changed all that. The clue is that there are many different sub-functions of speech production, from vocabulary management and sentence construction to articulatory movements of tongue, lips, palate, etc, control of vocal chords and voice box, breathing control and so forth.

It is now established that injuries in different brain locations undermine speech production differently. So the design principle of "special boxes" is saved.

Let us take a look at some performance parameters of the brain, viewed as an information processing device. The maximum bit rates and bit storage shown in Table 1 are as low by present-day electronic standards as to be embarrassing.

Consider, in particular, the upper bound to the quantity of information that can be acquired and stored in a lifetime.

It could be argued that acquisition of a few economically coded facts and principles might suffice to generate much larger quantities of explicit information, by high-speed deduction from the initial compact form.

But the discovery that the brain's calculational speed amounts to a mere 20 binary discriminations per second puts a stopper on that. The rate at which we can mobilise information by calculation is of the same order as the rate at which we can take it into store directly from the outside world.

It should therefore be possible to encode everything that a doctor knows about

medicine, or a meteorologist about the weather, or Joe Brown about rock-climbing, or Karpov about chess in a computer store of dimensions which, today, would be regarded as reasonable; with

Source	Estimate
1 Rate of information transmission using any input or output channel	30bps
2 Maximum amount of information explicitly storable by the brain at 50	10 <sup>10</sup> bits
3 Number of mental discriminations per second during intelligent work	18
4 Number of addresses which can be held in short-term memory	7
5 Time to access an addressable "chunk" in long-term memory	2 sec
6 Rate of transfer from long-term to short-term memory of successive elements of one "chunk"	8 elements per sec

Table 1. Some information processing parameters of the human brain. Estimates are taken to be around 30% in the above, "bits" refers to units of information measurement, not to binary digits. Thus, 30 Yes-No decisions are sufficient to discriminate in a second one photograph from an ensemble of a billion alternatives. The number of black-and-white dots scanned in the process is typically very much higher.

Source - 1. Miller (1956) summarises the knowledge up to that date in *Psychology Review*, Vol 63, pp 81 to 87. Subsequent determinations are reviewed in any modern text in physiological psychology; 2. calculated from source 1 above (see text); 3. sources cited by Heister (1978) in *Elements of software science*, Elsevier; 4 to 6. sources cited by Chase and Simon (1973) in *Cognitive Psychology*, Vol 4, pages 85 to 81.

retrieval from store being handled by routines highly sparing of processor time.

To do this, however, we may have to find better ways of storing and matching descriptions than as sequentially coded truth functional procedures.

Work in cognitive psychology challenges the assumption that the brain represents concepts definitionally - hence current interest in software features such as semantic nets and hardware devices such as parallel array processors for manipulating patterns. Far-reaching consequences for programming "expert systems" follow from some of these facts. Much can be gleaned from an important new book, *Pattern-directed inference systems*.

A form of "Broca's aphasia" results from a highly localised injury. The patient talks like an Aberdonian's telegram, omitting all the grammatical signposts like "the", "a", "up", "down", "off", "by", "with", "to", "from", "in", "on", "through", "this", "that", "of", "while", "when", "is", "are", "would", "will", and so forth, and also the grammatical inflexions which distinguish, say, "bite", "bites", "bit", and "bitten".

Since these people seem to understand the speech of others, it was at first thought to be a disorder of speech production, leaving comprehension unaffected.

This has now been disproved. These aphasics have their "grammar box" as totally inactivated or absent when listening as when speaking. But by inferring "likely meaning" from their knowledge of nouns, verbs etc, they manage to perform plausibly on comprehension tests.

Normal brains employ different retrieval mechanisms according to whether they are handling words of the first or second type - another instance of "special boxes for special tricks". Patients with the described aphasia, as expected, have only one word-retrieval mechanism and do not handle words of the first type at all - except to recognise that the words exist and belong to the language.

Pattern directed inference systems, edited by D. A. Waterman and F. Hayes-Roth. Academic Press, 24 Oval Road, London, NW1.

## SOFTWARE FILE-1

## Online capability for end-users

THE information retrieval and reporting package Data Analyser has gained a significant new online capability in the form of a CICS extension. The extension is also available for its sister system, Audit Analyser.

With the new software, users of either package can create and submit report requests at the terminal, end subsequently examine the output. This capability was previously restricted to the IMS version, which uses IMS/DC facilities to achieve the same result.

Relatively unknown in this country, Data Analyser and Audit Analyser were developed by Program Products Inc in the US and are designed for much the same end-user applications as *an Informatics' Mark IV*, *Pen-sophic's Easytrieve*, and *Computer Associates' CA-Earl*.

The same central software is used in each, the audit package

offering in addition tailored auditing routines.

World-wide, the packages enjoy a substantial user base, currently around 420. Usage in the UK is by contrast restricted to small but prestigious groups including Barclays Bank, Rank Xerox, Price Waterhouse, and Turner and Newall.

This is attributed by the UK agents, Coveford Data Systems, to the relatively minor marketing effort so far invested here. CDS took over the agency from Cara Consulting just over a year ago and this year plans a marketing drive which is aimed at doubling the number of users.

Concurrently with gaining the new online capability, the packages have been enhanced with an interface to Cullinane's IDMS database management system. Interfaces to IMS, DL/I, and Cincrom's Total were already available.

## European Blis/Cobol users' first meeting

THE first meeting was held last month of the European Blis/Cobol users' group. Held in the London offices of Software Implementation Ltd, it was attended by some 15 users and a representative from IPI, the Florida-based software house that wrote the system.

Chairman of the new group is Ian Duffell, of the Chloride Group. The secretary is Richard

2903 Filetab maintenance

AN online program maintenance system for ICI 2903/4 Filetab users has been developed by Gresham Computer Services. Called Videlab, it allows a standard ICL screen to be used for inputting and editing Filetab source code.

The software supports true in-situ updating and is said as a result to be very fast when used to make program corrections. It is also efficient in its use of file space, re-using dead space at the first opportunity so that no separate reorganization run is required.

Videlab, which is also available under DME2 on the 2950, is a companion product to Gresham's earlier 2903/4 systems: Videob for Cobol editing, and Videmap for screen formatting.

Leyton, of SIL, and the technical co-ordinator, Tony Day, of Security Computing Services.

Six UK organisations use Blis/Cobol directly, in addition software houses, including DG's MicroNova, have supplied a number of turnkey systems based on the software.

Blis/Cobol supports multi-user Cobol on the Data General Nova and includes a sophisticated mainframe-type operating system. A version running DG's MicroNova was announced earlier this year (Software File, February 1).

Blis/Cobol is to be offered to Lear-Siegler's VDP-1000 business system (CW, December 1, 1978), following the signing of a contract between Lear-Siegler's Data Products Division and IPI.

Package rental

THE DEC datatypes software house Time Utilising Business Systems, of Leicester, is offering its range of application packages on a rental basis to help minimise set-up costs for first-time DP users.

Bank adaptation

ASSEMBLER level software for Chubb Electronics' MicroNova range of automatic banking machines is being produced with assistance of Zeus-Harman.

## SOFTWARE FILE-2

## UGG Seven released

AN OS operations management aid has been launched by the University Computing Company in Europe following the release of the software in the US last July. Called UGC Seven, the package is an automated production control system designed to improve data centre workflow.

Like Value's Apollo (Software File, May 11, 1978), an important feature of the package is automatic job submission. CPU jobs can be loaded automatically dependent on specified pre-conditions such as the date and the completion of other jobs.

The system database also caters for non-CPU activities such as data preparation. Both these activities and CPU work can be scheduled automatically, with prompts from the system when work becomes overdue.

Current production status can be investigated online.

## MVS performance monitor from CPP

WITH MVS emerging as IBM's only large-scale operating system for the future, Computer Program Products has launched its first package specifically designed for total MVS performance monitoring.

The system is called CMF (Comprehensive Management Facility) and originates, like much of CAP-PP's performance-oriented software, from Bools and Babbage in the US.

Described as a family of products, CMF consists of a central or "master" monitor which controls a number of "sub-monitors." The latter performs most of the detailed analysis tasks

and may be switched on or off as required.

The master monitor enables these separate results to be correlated, so that a total picture of the system can be obtained. It is also responsible for activating the submonitors, either at regular sampling intervals or when particular events occur - for example, excessive TSO response time or a high paging rate.

Because of this architecture, CMF is said to incur the minimum possible operational overhead while facilitating a top-down approach to problem investigation.

Data collected by the system is available to the user in a number of forms, including real time online displays. The package also has a graphics facility, enabling plots, pie charts and Kiviat graphs to be produced on a line printer.

CMF is being offered on en

exchange basis to existing SMS/CUE users, costing £3,000 before May 1, and £5,665 thereafter. For new users, the corresponding prices are £10,665 and £13,330.

The equivalent IBM facility, RMF II, costs around £180 per month per CPU. CMF, argues CPP, offers significant advantages over the IBM product and is competitively priced.

## Alternative Basic from Waterloo

A SECOND Basic Interpreter will support six terminals on a 128K Model D processor, and up to 16 on a 256K Series 1. Designed for both educational and commercial use, the language will include structured programming commands and a variety of diagnostics, and will be accompanied by an editing

## Two BCS meetings for Cobol specialists

THE BCS Cobol specialist group is holding two meetings this month which promise to be of exceptional interest.

On Wednesday, March 21, Kit Grindley will talk on Systematics, a systems analysis tool for system definition. He will describe a new program generator that creates Cobol programs directly from Systematics forms. The meeting is scheduled for 2.15 at the Polytechnic of Central London.

On the following Wednesday, March 29, Computer Weekly's regular columnist Tom Glibb is to talk on Design by Objectives. An overview of new tools for top-down system and program design, his insights are likely to be of major interest not only to Cobol programmers but to analysts and programmers working in any language.

This meeting will be held at 2.15 in Clerke Hall, Institute of Education, Bedford Way, London WC1. Admission will be by ticket obtainable of £1 from Derek Shuttlewood, Computer Dept, Sun Alliance & London, Sun Alliance House, North St, Hove, Sussex, BN1 1AB.

system.

Last year, Gulf Computing Systems of Kuwait acquired worldwide rights outside the US to the only other Series 1 Basic interpreter extant (Software File, July 6, 1978). This system, Basic/1, is still sold within the US by Data Systems Inc. of Denver, Colorado.

## PROGRAMMER NOTES

## Spread the Gospel before it's too late

WITH silicon chips et al forcing their way into public awareness, one of the nicest consequences would be more widespread understanding of simple computer jargon.

I say "could" because personal experience to date has been more than somewhat disappointing.

Friends and relations, trying to be interested, cannot remember from one week to the next just what you said that software was. And any attempt to explain deeper mysteries causes their eyes to glaze over rapidly.

Judging by my own circle, the idea of hardware is grasped fairly easily, and most people have at least heard of programming. But I would accept no bets that they could successfully identify an example of either.

Are the respective functions of hardware and software understood at all, with the result that incidents in contemporary folklore such as the £1 million gas bill are blamed indiscriminately on "the computer."

Computing, of course, does

not enjoy a good public image. Programmers are still widely regarded as mathematical buffoons, and widespread misunderstanding of the capabilities of computer systems leads to misplaced anxieties about their application.

The fact is, I suggest, that computing is still seen as a "science" and this persuades people that it will be conceptually difficult to understand. Not only this, but they are somehow proud of their ignorance, fulfilling the scheme described by C. P. Snow in "The Two Cultures."

All of this, you may say, does not matter very much. And up until very recently you might have been right.

But computing is now forcing itself into a much more prominent position in society at large and a failure to grasp its essential concepts could lead to many problems.

If computing professionals are not to become the Morlocks of a future divided world, they should set about proselytising among the potential, Et al no mean speed.

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## Puzzler

MY youngest son recently brought home from school a rather unusual sum. The class had been doing multiplication, and one of the calculations had by chance produced all nine digits from 1 to 9 once only.

Here is the layout of the figure, with just the 4 given as a clue. Can you reconstruct the sum before turning to page 61.

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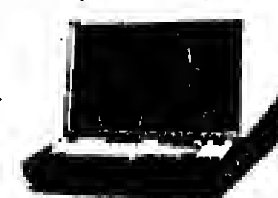
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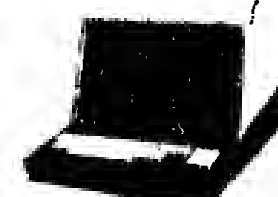


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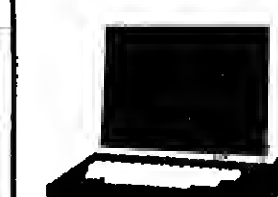
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- \* Green Phosphor Non-glare screen



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- \* Dual Interface - CCITT V24 and 20/80 mA Current Loop
- \* Teletype Compatible
- \* Hard Copy Printer Output
- \* Selectable Half or Full Duplex
- \* Video Output for External Monitors
- \* Green Phosphor Non-glare screen



## Model 7000

- \* Teletype Compatible
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- \* Selectable Baud Rates from 60 to 19,200 Baud
- \* CCITT V24 Interface
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MICHIE'S PRIVATEVIEW  
Special boxes  
for special tricks

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It is now established that injuries in different brain locations undermine speech production differently. So the design principle of "special boxes" is saved.

Let us take a look at some performance parameters of the brain, viewed as an information processing device. The maximum bit rates and bit storages shown in Table 1 are as low by present-day electronic standards as to be embarrassing.

Consider, in particular, the upper bound to the quantity of information that can be acquired and stored in a lifetime. It could be argued that acquisition of a few economically coded facts and principles might suffice to generate much larger quantities of explicit information, by high-speed deduction from the initial compact form.

But the discovery that the brain's calculational speed amounts to a mere 20 binary discriminations per second puts a stopper on that. The rate at which we can mobilise information by calculation is of the same order as the rate at which we can take it into store directly from the outside world.

It should therefore be possible to encode everything that a doctor knows about

medicine, or a meteorologist about the weather, or Joe Brown about rock-climbing, or Karpov about chess in a computer store of dimensions which, today, would be regarded as reasonable; with

Source	Estimation
1 Rate of information transmission along any input or output channel	30bps
2 Maximum amount of information explicitly storable by the age of 50	10 <sup>10</sup> bits
3 Number of mental discriminations per second during intellectual work	18
4 Number of addresses which can be held in short-term memory	7
5 Time to access an addressable "chunk" in long term memory	2 secs
6 Rate of transfer from long term to short term memory of successive elements of one "chunk"	3 elements per sec

Table 1. Some information processing parameters of the human brain. Estimation errors can be taken to be around 30%. In the above, "bits" refers to units of information measurement, not to binary digits. Thus, 30 Yes-No decisions are sufficient to discriminate in a second one photographic portrait from an ensemble of a billion alternatives. The number of black-and-white dots sensed in the process is typically very much higher.

Source - J. Miller (1958) summarises the knowledge up to that date in *Psychology Review*, Vol 65, pp 81 to 97. Subsequent determinations are reviewed in *Modern test in physiological psychology*, 2, calculated from sources 1 above (see text); 3, sources cited by Helstead (1978) in *Elements of human science*, Elsevier; 4, to 6, sources cited by Chase and Simon (1973) in *Cognitive Psychology*, Vol 4, pages 55 to 81.

retrieval from store being handled by routines highly sparing of processor time.

To do this, however, we may have to find better ways of storing and matching descriptions than as aequally coded truth functional procedures.

Work in cognitive psychology challenges the assumption that the brain represents concepts definitionally - hence current interest in software features such as semantic nets and hardware devices such as parallel array processors for manipulating patterns. Far-reaching consequences for programming "expert systems" follow from some of these facts. Much can be gleaned from an important new book, *Pattern-directed inference systems*.

A form of "Broca's aphasia" results from a highly localised injury. The patient talks like an Aberdonian's telegram, omitting all the grammatical signposts like "the", "a", "up", "down", "off", "by", "with", "to", "from", "in", "on", "through", "this", "that", "of", "while", "when", "is", "are", "would", "will", and so forth, and also the grammatical inflexions which distinguish, say, "bite", "bites", "bit", and "bitten".

Since these people seem to understand the speech of others, it was at first thought to be a disorder of speech production, leaving comprehension unaffected.

This has now been disproved. These aphasics have their "grammar box" as totally inactivated or absent when listening as when speaking. But by inferring "likely meaning" from their knowledge of nouns, verbs etc, they manage to perform plausibly on comprehension tests.

Normal brains employ different retrieval mechanisms according to whether they are handling words of the first or second type - another instance of "special boxes for special tricks". Patients with the described aphasia, as expected, have only one word retrieval mechanism and do not handle words of the first type at all - except to recognise that the words exist and belong to the language.

Pattern directed inference systems, edited by D. A. Watanabe and P. Hayes-Roth, Academic Press, 24 Oval Road, London, NW1.

## SOFTWARE FILE-1

Online capability  
for end-users

THE information retrieval and reporting package Data Analyst has gained a significant new online capability in the form of a CICS extension. The extension is also available for its sister system, Audit Analyst.

With the new software, users of either package can create and submit report requests at the terminal, and subsequently examine the output. This capability was previously restricted to the IMS version, which uses IMS/DC facilities to achieve the same result.

Relatively unknown in this country, Data Analyst and Audit Analyst were developed by Program Products Inc in the US and are designed for much the same end-user applications as Informatics' Mark IV, Pan-sophic's Easytrieve, and Computer Associates' CA-Earl.

The same central software is used in each, the audit package

offering in addition tailored auditing routines.

World-wide, the packages enjoy a substantial user base, currently around 420. Usage in the UK is by contrast restricted to a small but prestigious group including Barclays Bank, Rank Xerox, Price Waterhouse, and Turner and Newall.

This is attributed by the UK agents, Covelord Data Systems, to the relatively minor marketing effort so far invested here. CDS took over the agency from Carr Consulting just over a year ago and this year plans a marketing drive which is aimed at doubling the number of users.

Concurrently with gaining a new online capability, the packages have been enhanced with an interface to Cullman's DMS database management system. Interfaces to IMS, DLA, and Cincom's Total were already available.

European Blis/Cobol  
users' first meeting

THE first meeting was held last month of the European Blis/Cobol users' group. Held in the London offices of Software Implementation Ltd, it was attended by some 15 users and a representative from IPL, the Florida-based software house that wrote the system.

Chairman of the new group is Ian Duffell, of the Chloride Group. The secretary is Richard

2903 Filetab  
maintenance

AN online program maintenance system for ICL 2903/4 Filetab users has been developed by Gresham Computer Services. Called Videotab, it allows a standard ICL screen to be used for inputting and editing Filetab source code.

The software supports true in-situ updating and is said to be a result to be very fast when used to make program corrections. It is also efficient in its use of file space, re-using dead space at the first opportunity so that no separate reorganisation run is required.

Videotab, which is also available under DME2 on the 2050, is a companion product to Gresham's earlier 2903/4 systems: Videocob for Cobol editing, and Videomap for screen formatting.

Leyton, of SIL, and the technical co-ordinator Tony Ogilvie, of Security Computing Services.

Six UK organisations - Blis/Cobol directly, in addition software houses, including Security Computing Services, have supplied a number of turnkey systems based on the software.

Blis/Cobol supports end-user Cobol on the Data General Nova and includes a sophisticated miniframe-type operating system. A version running on the MicroNova was announced earlier this year (see wire file, February 13).

Blis/Cobol is to be offered by Lear Siegler's VDP-1000 business system (CW, December 1978), following the signing of a contract between Lear Siegler Data Products Division and IPL.

## Package rental

THE DEC datatypes software house Time Utilising Business Systems, of Leicester, is offering its range of application packages in a rental basis to help minimise set-up costs for firms using DP users.

## Bank adaptation

ASSEMBLER level software Chubb Electronics, of London, is being produced with assistance of Zenith

## SOFTWARE FILE-2

UCC Seven  
released

AN OS operations management aid has been launched by the University Computing Company in Europe following the release of the software in the US last July. Called UCC Seven, the package is an automated production control system designed to improve data centre workflow.

Like Value's Apollo (Software File, May 11, 1978), an important feature of the package is automatic job submission. CPU jobs can be loaded automatically dependent on specified pre-conditions such as the date and the completion of other jobs.

The system database also caters for non-CPU activities such as data preparation. Both these activities and CPU work can be scheduled automatically, with prompts from the system when work becomes overdue.

Current production status can be investigated online.

## PROGRAMMER NOTES

Spread the Gospel  
before it's too late

WITH silicon chips et al forcing their way into public awareness, one of the nicest consequences would be more widespread understanding of simple computer jargon.

I say "could" because personal experience to date has been more than somewhat disappointing.

Friends and relations, trying to be interested, cannot remember from one week to the next just what you said that software was. And any attempt to explain deeper mysteries causes their eyes to glaze over rapidly.

Judging by my own circle, the idea of hardware is grasped fairly easily, and most people have at least heard of programming. But I would accept no bets that they could successfully identify an example of either.

Nor are the respective functions of hardware and software understood at all, with the result that incidents in contemporary folklore such as the £1 million gas bill are blamed indiscriminately on "the computer."

Computing, of course, does

MVS performance  
monitor from CPP

WITH MVS emerging as IBM's only large-scale operating system for the future, Computer Program Products has launched its first package specifically designed for total MVS performance monitoring.

The system is called CMF (Comprehensive Management Facility) and originates, like much of CAP-PP's performance-oriented software, from Boole and Babbage in the US.

Described as a family of products, CMF consists of a central or "master" monitor which controls a number of "submonitors." The latter performs most of the detailed analysis tasks

and may be switched on or off as required.

The master monitor enables these separate results to be correlated, so that a total picture of the system can be obtained. It is also responsible for activating the submonitors, either at regular sampling intervals or when particular events occur - for example, excessive TSO response time or a high paging rate.

Because of this architecture, CMF is said to incur the minimum possible operational overhead while facilitating a top-down approach to problem investigation.

Data collected by the system is available to the user in a number of forms, including real time online displays. The package also has a graphics facility, enabling plots, pie charts and Kiviat graphs to be produced on a line printer.

CMF is being offered on an

exchange basis to existing SMS/CUE users, costing £3,000 before May 1, and £5,965 thereafter. For new users, the corresponding prices are £10,665 and £13,330.

The equivalent IBM facility, RMF II, costs around £190 per month per CPU. CMF, argues CPP, offers significant advantages over the IBM product and is competitively priced.

CMF is being offered on an

exchange basis to existing SMS/CUE users, costing £3,000 before May 1, and £5,965 thereafter. For new users, the corresponding prices are £10,665 and £13,330.

CMF is being offered on an

Two BCS meetings for  
Cobol specialists

THE BCS Cobol specialist group is holding two meetings this month which promise to be of exceptional interest.

On Wednesday, March 21, Kit Grindley will talk on Systematics, a systems analysis tool for system definition. He will describe a new program generator that creates Cobol programs directly from Systematics forms. The meeting is scheduled for 2.15 at the Polytechnic of Central London.

On the following Wednesday, March 28, Computer Weekly's regular columnist Tom Gibb is to talk on Design by Objectives. An overview of new tools for top-down system and program design, his insights are likely to be of major interest not only to Cobol programmers but to analysts and programmers working in any language.

This meeting will be held at 2.15 in Clarke Hall, Institute of Education, Bedford Way, London WC1. Admission will be by ticket obtainable at £1 from Derek Shuttlewood, Computer Dept, Sun Alliance & London, Sun Alliance House, North St, Hoxham, tel: 0403 84164.

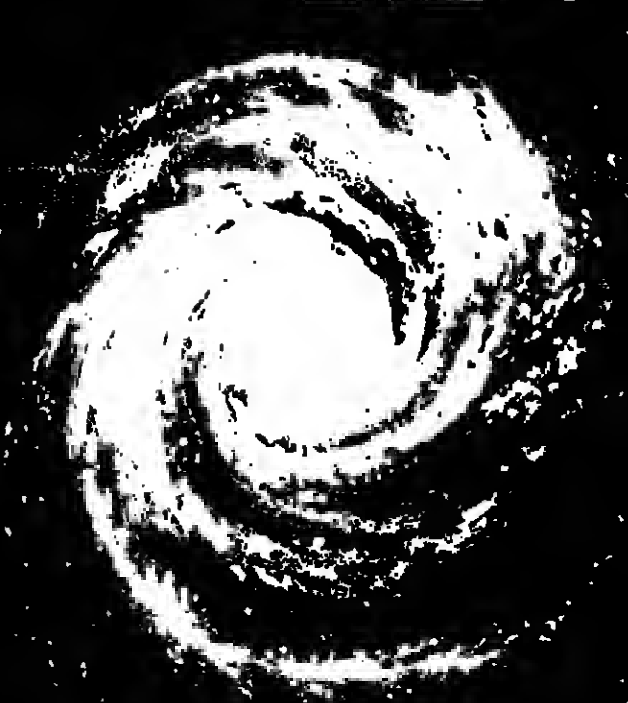
## Alternative Basic from Waterloo

A SECOND Basic interpreter has been developed for IBM's Series 1 minicomputer. Written by the University of Waterloo, Ontario, the software is said to run under the RPS operating system, occupying about 80K bytes of memory. It will be available in the US around April or May.

Reports say that the system will support six terminals on a 128K Model D processor, and up to 16 on a 256K Series 1. Designed for both educational and commercial use, the language will include structured programming commands and a variety of diagnostics, and will be accompanied by an editing system.

Last year, Gulf Computing Systems of Kuwait acquired worldwide rights outside the US to the only other Series 1 Basic interpreter extant (Software File, July 6, 1978). This system, Basic/1, is still sold within the US by Data Systems Inc, of Denver, Colorado.

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## Puzzler

MY youngest son recently brought home from school a rather unusual sum. The class had been doing multiplication, and one of the calculations had by chance produced all nine digits from 1 to 9 once only.

Here is the layout of the figures, with just the 4 given as a clue. Can you reconstruct the sum before turning to page 81.

## Prime number

PRIME customers anywhere in the UK can now phone 01-572 0179 if they have a query relating to any Prime software product. They will get through to the Customer Support Desk, a new service which can put a user in touch with the appropriate software specialist. Apart from the cost of the call the service is free.



OP SPOT

# Government chaos after ops' withdrawal of labour

ANY person who needed convincing of the importance of operations staff, both within the computer industry and on a national level, must have been swayed by the civil servants' strike last week, which paralysed vital government computer centres (CW, March 1).

## Air your views

OPERATORS often complain that nobody listens to their point of view. Well, Op Spot is listening and Bernard Allen would like to hear your opinions and ideas on all matters relating to computer operations. Your letters should be sent to Op Spot, Computer Weekly, Dorset House, Stamford Street, London SE1 8LU. Telephone calls are equally welcome and Bernard can be contacted directly on 01-281 8035.

Pushing pay claims for their 330,000 joint membership, the Society of Civil and Public Servants' Association, withdrew about 1,300 staff from selected centres.

The action, which the union said would remain in effect until the government met their claims, immediately halted the flow of large amounts of government revenue at sites such as the Customs and Excise centre in Southend and the Ministry of Agriculture centre in Guildford.

While programming and systems staff played important roles in the action, the immediate damage was inflicted by the relatively few operators involved.

That fact highlights two vital issues: operations staff play a critical role not only within the

computer industry but on a broader level also; and the fact that few persons are needed to run a computer system also means that only a few have to withdraw their labour to cause chaos.

At the Southend centre, for example, 80 of the 142 staff taken out by the union were operators. That disrupted the collection of VAT revenue, worth £500 million per week, the repayment of VAT to traders, worth £100 million, and the compilation of trade statistics.

Action at the Ministry of Agriculture in Guildford halted the payment of grants and subsidies to farmers — about £6 million is involved every week — and stopped the production of statistics needed by the EEC for reimbursements to Britain worth between £200 million and £300 million per year.

Action by operations staff at the Ministry of Defence centre in Chorley disrupted the maintenance of accounts, payments to government contractors and production control in ordnance factories.

Donn Parker, computer fraud expert at Stanford Research Institute in the US, once remarked that programmers are the most dangerous people in the computer field. I suggest that he is wrong.

## Back from Iran

RECENTLY returned from strife-torn Iran is Grenville Mills, formerly operations manager at the Tehran site of Iran Air. An interview with Mills, concerning technical rather than political issues, will appear in Op Spot soon.



COMPUTER personnel agency Effette Gravis has introduced a monthly competition intended to reward its established contract staff and attract new clients. First winner is contract operator Chessman (right), who is receiving his prize, a £100 Thomas Cook travel voucher, from Mike Hampton, a spokeswoman.

## Define your terms when changing jobs

BEFORE accepting a position with a company, an operator should take the trouble to find out the exact details of the terms of employment being offered.

It is vital that he learns everything about the number of staff he will work with and the person to whom he will report, facilities and conditions at the installation, and, most importantly, salary and grading reviews.

All this is very important. And I stress the matter after hearing of a disturbing case of an operator who lost his job as a result of a lack of awareness.

Although it was not mentioned at his interview, the company expected the operator to work alone in the computer room at all times. And the company assumed that he would complete evening shifts without a single break away from the machine room.

It was all a bit too much for the unfortunate operator. After a short while he complained to the site management and, following talks with his union representative, a hot-plate was provided so that the operators could cook food in the computer room.

In the meantime, the union had been involved in pay negotiations with the company on behalf of its members. They eventually agreed terms and, along with all other employees, the operator's salary was increased.

However, shortly afterwards, the increment was deducted from his pay. He was informed by the management that the company had anticipated the union claim and that the rise had been added to his salary at the time he joined the company.

Soon afterwards, he was called into a meeting with management. Informed that the company considered him unsuitable for employment — he had been on probation — and was given an ultimatum: resign or be sacked.

He chose to resign because he feared that a sacking would look bad on his employment record and make it difficult for him to find a position elsewhere.

The operator did not ask for

his union representative to attend the meeting because he had no idea that he was to be dismissed by the company. As he had been at the company for less than 20 weeks he had no right to appeal to an industrial tribunal for unfair dismissal. A solicitor later informed him that he could sue the company to court and, if successful, could win a large sum of money. But he didn't have a strong case, anyway.

Now some might consider that the operator could at least have contributed to his downfall by questioning the running of the installation soon as he started to work. Further, that having got into a difficult situation, he should have refused to resign and called in his union representative immediately.

I would disagree with the first point. In my view, we as operators allow management to dictate to them. To me, the operator to work alone without a break is a sick joke. In my judgment, although it is a bit late, the operator was put on him.

But, in my view, the real issue is that at many sites there is a lack of standards in relation to the operations department. In past Op Spots I have stressed the need for operators to stand up for themselves. In interviews it is important to find out just what the company is offering, and to accept or decline accordingly.

Remember, the interview provides an opportunity to find out about the company and, in particular, the operational environment. Use it to learn as much as you can, including the following:

- 1 — Salary, and how often reviewed;
- 2 — Grading reviews;
- 3 — Facilities and conditions at the site;
- 4 — The number of staff you will work with and the person to whom you will report;
- 5 — By finding out in advance, you can save yourself a lot of bleats later on.

## HINT OF THE WEEK

### Look after punch cards

LAST week in Op Spot we had a hint relating to punched output in the IBM DS environment. And this week I would like, briefly, to consider the use of punch cards in general.

If stored in damp conditions, they sometimes become bowed, or warped, and so present the operator with a number of time-consuming, if not insurmountable, file problems.

Such cards tend to get caught up in the workings of punch units, particularly the older, more mechanical devices. And when this happens, the operator has to open up the unit and clear the error.

In addition, they often cause

feed stops and punch errors. If an operator is not careful, they can cause a lot of trouble. Each time you use a punch card, check it for damage. If you find it is damaged, do not use it. If you find it is damaged, do not use it. If you find it is damaged, do not use it.

By Bernard Allen

# Victory for doctors on confidentiality

DOCTORS have gained a victory in their efforts to have a say in the confidentiality of the proposed Child Health Computer System (CW, August 3 and May 4 1978).

At a meeting between the British Medical Association and Sir Henry Yellowlees, chief medical officer at the DHSS, it was agreed that no proposals for further development would go ahead without consultation with the BMA and the Joint Consultants' Committee.

The DHSS also agreed that none of the pilot schemes that had been planned would go ahead at present.

Yellowlees took away from the meeting a list of questions about security of this type of computer system, that had been drawn up by the BMA with

the help of computer experts, and he has promised to reply to them all.

The BMA Ethics Committee has for some time been protesting that adequate provisions for safeguarding patients' confidentiality had been included in plans for the "Standard Child Health System, Pre-school Module", which would store centrally medical information about all children up to the age of five in England and Wales.

The association is "delighted" with the results of the meeting, according to a spokesman. There were particular worries about the pilot schemes, which would have experimented with confidential details of "real live people", she said.

The Joint Consultants' Committee comprises representatives of the BMA and the Royal College of Physicians and Surgeons.

## Adv't of year award

ORGANISERS of the "Computer advertisement of the year award" have extended the closing date for entries to March 31, to cater for the large amount of last minute interest. The 20 entries expected will be judged by a panel which includes Computer Weekly editor Gareth Jones. Prizes for the competition include trophies and a £100 cheque.

Each entry should be mounted on stiff card and accompanied by a cheque for £10 payable to the SCS Specialist Group for the disabled, to which all the proceeds are to be given. Entry forms are available from Beverley Dellow, Couchman Ltd, 42 Great Windmill Street, London W1V 7PA, Tel 01-437 4187.

## Intel may launch 'megabubble' memory

FOLLOWING the formation of a division aimed at developing bubble memory products (CW, November 3, 1977), Intel has removed secret about what and when its first product entry in this field might be. US sources, however, now indicate that the division, Intel Magnetics, is about to launch the highest bubble memory device yet made, and that it may be introduced as part of a new computer system from the company.

Intel Magnetics is rumoured to be introducing a one Megabit memory this spring. The device is thought to make use of 2.4 micron diameter bubbles, which compares with the 2.7 micron diameter used by Texas Instruments. TI, like Rockwell, currently has available a 256K bit memory.

The sources also indicate that Intel will follow the trend set by Texas Instruments when it first entered the bubble memory market. TI launched its memory on the back of a concurrent systems introduction and Intel may do the same.

## Report surveys the European mini scene

A REPORT\* from IDC Europe on the European minicomputer business, published this month, says that in 1977, Hewlett-Packard was number one minicomputer by value in Western Europe, with business worth \$150 million. Long the leader, Digital Equipment Corp fell to second place with \$135 million in sales, while Data General was third with \$90 million and Siemens fourth with \$31 million.

The report, which has not been made available for review although it can be examined at the company's offices, also includes figures for number of systems shipped. However, as DEC alone has products ranging from the PDP-11/70 down to the LSI-11/2 such figures reveal little. It can be inferred that since Data General has the

highest level by volume, the Nova 3 did well at the expense of the PDP-11/34, for which DEC was having to quote deliveries in excess of one year for a period. The summary of the report provided by IDC notes that the four UK minicomputer firms, GEC, CII, and Digico, have 21% of the UK installed base by number, and presumably also at least as high a percentage by

value, since all but Digico are primarily in the high value end of the market.

The figures, which refer to 1977, fail to reflect the benefits gained by Honeywell as a result of its Level 8 minicomputer line, which appears to have really begun to take off in 1978.

\* Minicomputer Marketplace — Western Europe 1977-1982, £1,350. IDC Europe, Bath Road, London W4 1ET. Tel 01-255 9222.

## Braille printer from Norsk

A BRAILLE printer and typesetting software, which enable editions for the blind of run-of-the-mill books to be produced cheaply, have been devised by the Norwegian Research Institute and Norsk Data. The production model of the printer, when it comes on the market, will produce Braille on paper, both sides, at a rate of 230 characters per second.

The machine will also emboss the Braille on metal plates from which multiple copies can be made. Since the driving software is an adaptation of Norsk Data's standard typesetting software, and many books are now printed using computer setting, it is practical at the end of a run of, say, a schoolbook to produce a few copies for blind children. This saves the formidable extra cost of rekeyboarding.

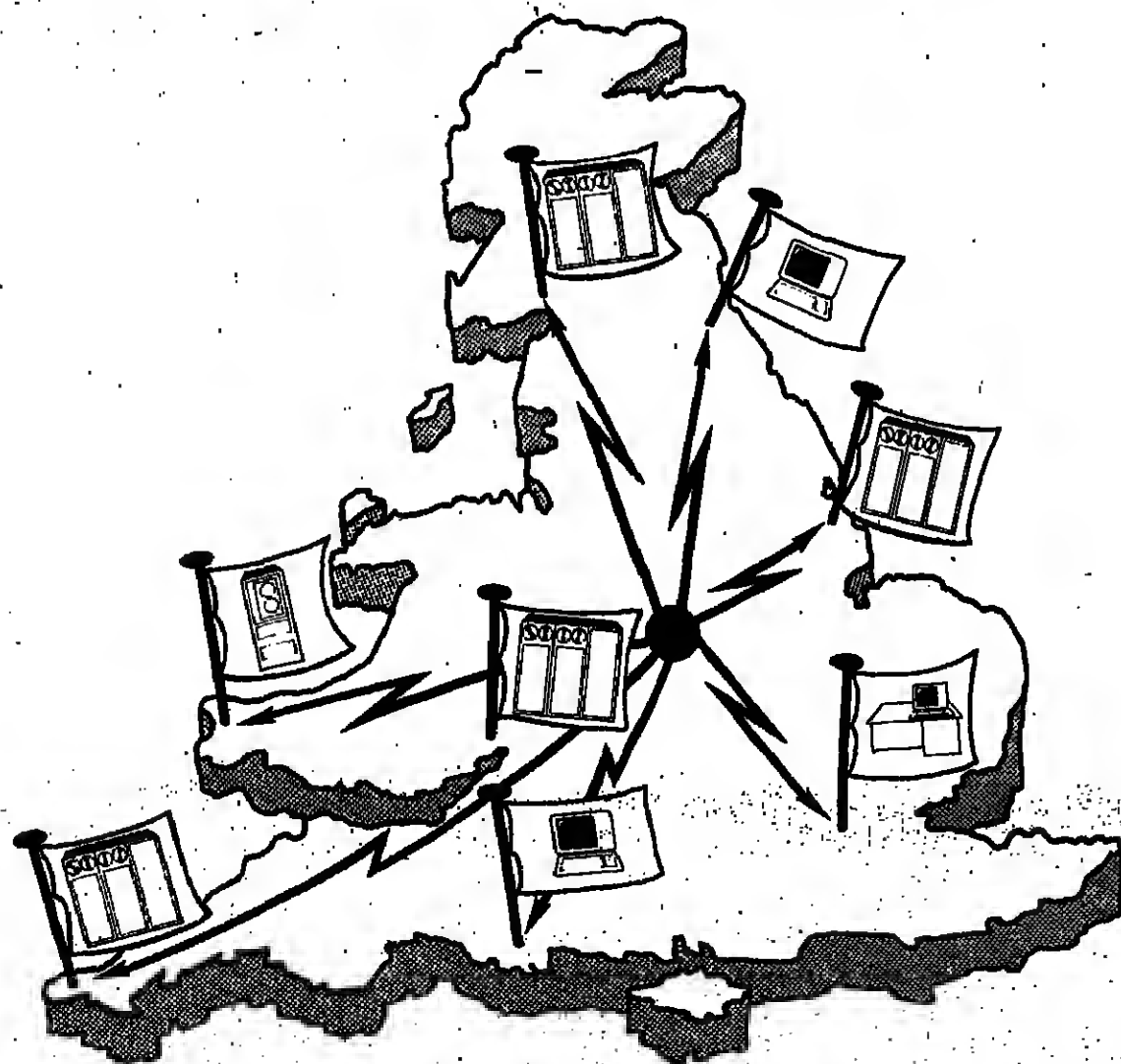
If corrections need to be made to the Braille text, it can be displayed (as Braille patterns) on a VDU before the embossing takes place. Formerly corrections could only be made on the metal plates, by hammering, a cumbersome process.



## Course for Kuwait students

TAKING advantage of the burgeoning interest in data processing in the Middle East, the National Council Board's computer services subsidiary, Compuser, has won a contract from the Kuwait Ministry of Planning to provide a specially tailored 28-week course for 11 people from Kuwait. The course is being held at Compuser's residential training centre at Cennock, Staffs, and some of the students from Kuwait are seen here with Compuser's head of training, Brian Dunning (second from right), who negotiated the contract when he made a sales trip to the Middle East last September. Next month Dunning plans to visit Abu Dhabi, Iraq, Libya and Saudi Arabia.

# CMC SOVEREIGN knows how to communicate



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## PEOPLE AND EVENTS

## Key jobs at Honeywell

A NUMBER of key marketing appointments have been announced by Honeywell Information Systems, based at the company's minicomputer and terminals division in Hemel Hempstead. Colin Kindred will continue as manager of national minicomputer sales, with responsibility for Level 6 sales. Appointed sales manager of the government and public sector is Ronald Needham, who has gained experience of dealing with government computing agencies through his former position of sales director for Computer Sciences International.

Robert Henderson, who has recently returned from Honeywell in Italy, has taken the position of export marketing manager, and James Beard joins the UK marketing team as marketing manager for distributed systems sold through Honeywell's Data Processing and General Systems Divisions. His previous assignments include national sales manager for Raytheon Corp in the US.

Manager of marketing operations for Level 6 product marketing, software planning and promotions, is David Norton. He was formerly Honeywell's marketing support manager for minicomputers.



David Constable has joined Infotech's UK sales operation as sales executive. He was formerly a salesman with Rediffon Computers. Senior systems engineer for the Infotech Midlands region is John Lea, previously systems consultant with Rediffon. A former sales executive with CDC, Geoff Garside has been appointed senior sales representative in the South West.

David Pearson, formerly projects manager with Sys-Com (Computers), has been appointed to the board of the company as production director. Before joining Sys-Com, he was a systems manager with Singer Business Machines.

As part of the technical study tour of Europe, a group of Brazilian students recently included a visit to the Wythenshawe division of Ferranti Computer Systems. The 18 visitors are all final year electronics students at the Instituto Tecnológico Aeronáutico in São Paulo, Brazil, and the UK part of their

Bryan Churcher, marketing manager of P-E Computer Services, has been appointed to the company's board as director responsible of market strategy.

Roger Kaye has become general manager of Energy Communica-

tion, the Aberdeen based telecommunications company. He succeeds Ian Rumbles, who will be transferred by the parent company IAL to Nairobi as managing director of IAL's associated company (IA)EAL. Kaye was formerly engineering manager with ECL, and his previous

experience includes the installation of the Camber coxial cable in Bermuda, while he was employed by Cable and Wireless.

Richard Coe has become senior systems analyst for the South-West branch of Rediffon Computers. He was formerly computer manager with MailMarking Systems and the South-East Branch is Steve Humble, who before joining Rediffon was a systems analyst with Lyons Bakery of Banbury.

Orlando Tonlin has been named acting international sales manager for Randal Data Systems. He was formerly president of Minicom of Northern Michigan, and has been a Randal distributor for the past four years.

By Judith Morris

## Top DP man of the year

THE search is on for the best DP man in the world. The award, known as the Top DP man of the year, is given to the manager who, in the opinion, has most successfully achieved his targets in the last year. The award is given to the manager who, in the opinion, has most successfully achieved his targets in the last year. The award is given to the manager who, in the opinion, has most successfully achieved his targets in the last year.

Richard Travistay has joined Rediffon Computers as technical manager for the Northern branch. He was previously self-employed as an independent consultant of computer systems. Technical manager for the Midlands branch of the company is Frank Johnson, who formerly worked as a sales executive for Comshare.

Charles Zwinnigman has been appointed to the newly created position of corporate director of industrial relations of Penril Corp. He was formerly with CSC's Systems Group based in Falls Church, Virginia, a director of industrial relations.



Jim Shaw has been appointed technical manager for Central Data Systems. He was formerly technical development manager of the Mars group in the UK, and was responsible for all systems design and programming functions.

Chris Ibbett, operations director of System Industries (Europe) Ltd in Woking, has become international marketing director in the UK for the company's System Industries Ltd subsidiary. He will be based in Sunnyvale, California, and will be responsible for co-ordinating marketing and engineering activities.

## DIARY

**MARCH 10** Final of schools management game. BCS Holland branch, independent computer services, Queens Road, Belfast. Closed event.

**MARCH 11** Mathematics in telecommunications. E. M. Clayton. IRE Telecommunications networks and systems group. Savoy Place, London WC2.

**MARCH 12** People and computers in project management. One day seminar. Association of Project Managers. Waldorf Hotel, London WC2. Tel. 01-793 3182.

**MARCH 13** Mainframe interface seminar. Association of Project Managers. Waldorf Hotel, London WC2. Tel. 01-793 3182.

**MARCH 14** Word processing. B. Gifford. BCS Croydon branch, Fairfield Halls, Croydon. 10.15.

**OIV, BCS, Reading branch, Copper Inn, Pangbourne. 20.00.**

**MARCH 15** Automatic programming languages. J. Cockley. B. Weaver. BCS Harlow branch. Harlow Technical College. Harlow. 19.30.

**MARCH 16** Electronics and the industrial strategy. M. Clarke. IRE London Circuits and Student section. King's College, Strand, London WC2. Details J. F. Armstrong, 2 The Moat, Puckridge, Herts.

**MARCH 17** Displays in television. BCS Displays group. City University, London. 14.00. Details 0453-31281 ext 255.

**MARCH 18** Robotics for engineers. IMechE. 1 Strand, London SW1. Registration required. Tel. 0224 63277, ext. 68.

**MARCH 19** Mathematics, physics and perplexed youth. Prof. G. Mott. IMA/Institute of Physics. Natural History Museum, Cromwell Road, London SW7 5BD.

**MARCH 20** Project management symposium. BCS Coventry branch. Lancaster Polytechnic. 19.30.

**MARCH 21** IBM - the next five years. British State of the Art conference. Hotel Sofitel, Paris. Contact Dave Bilton 0628 86081.

**MARCH 22** Logic for databases and programs. R. Kowalski. BCS Formal Aspects of Computing Science Group. Polytechnic of Central London. London WC2. 18.30.

**MARCH 23** Recent developments in point of sale terminals. IRE/ERE Computer group. Royal Institution, Albert Square, London W1. 10.00.

**MARCH 24** Microprocessors - from the west point of view. Dr. E. G. Ashworth. IRE Luton branch. Luton Polytechnic. Luton. 19.30.

**MARCH 25** Practical privacy. Tel. City. 19.30. Control London. 19.30. Paul and Sue Studio, available in Luton. 19.30.

**MARCH 26** Mechanical handling and control of mail. P. J. O'Doherty. IRE, 100 Victoria Road, London SW1. 19.30.

**MARCH 27** IBM CUA Local extensions and County Hall, Essex. 14.00.

**MARCH 28** Vandalism school. IRE Essex. 19.30. Oxford. Oxford. 19.30. 19.30.

**MARCH 29** European Computing Network. Contact Dave Bates. 0453 31281.

**MARCH 30** Achieving project objectives. Association of Project Managers. Waldorf Hotel, London WC2. Tel. 01-793 3182.

**MARCH 31** The influence of computer on teaching of electronics. IRE/ERE Computer group. City University, London. 14.00. Details 0453-31281 ext 255.

**MARCH 31** Robotics for engineers. IMechE. 1 Strand, London SW1. Registration required. Tel. 0224 63277, ext. 68.

**MARCH 31** Mathematics, physics and perplexed youth. Prof. G. Mott. IMA/Institute of Physics. Natural History Museum, Cromwell Road, London SW7 5BD.

## Nixdorf into shared logic WP market

NIXDORF has entered the shared logic word processing market with a small, inexpensive system, costing \$40,000 for the largest configuration of four screens and two printers. As yet the Multi-Text 8840, as it is called, is available in the US and West Germany only.

The machine is based on the

CPU used in Nixdorf's key-to-disc equipment and small business systems, which is a look-alike to Data General's Nova. The processor costs \$15,000 including a five Megabyte disc and a dual floppy disc drive. Each screen and keyboard unit costs \$2,000.

The printers are Diablo daisy-

wheels with a new housing added by Nixdorf.

The limitation to four terminals will be eliminated soon when larger processors become available. Communications facilities are also in the pipeline.

Editing features include remargination, moving of blocks of text, hyphenation, automatic page numbering, and global search and replace.

Development of the Multi-Text 8840 took place in the US under the direction of Thomas Sinopoli, who was formerly with Wordplex.

## \$100,000 deal

PACKAGES of word processing applications software for solicitors and estate agents have been supplied to AES Wordplex by Alvan Consultants of Windsor, for sale with the Wordplex I machine. Included in the £100,000 deal are marketing documentation and sales assessments by territory.

The 8870/3 offers twice the power of the model it replaces, now takes up to 256K words of main memory, supports up to 16 local or remote workstations, and is programmed in Basic, with Cobol on the way.

The 8870/8 is an extension of the previous most powerful model, the 8870/6. The memory available to the user has been increased to 320K bytes and it now supports up to 16 workstations, up to four tape drives and five V24-compatible communications interfaces. More processor power is made available to the user by the introduction of microprocessors to take over such tasks as disc control, and the use of a hard-wired arithmetic processor. Languages offered are Cobol and RPG II.

The 8850 is a further enhancement of the original Entrex key-to-disc system, which was marketed in most European countries by Nixdorf before it acquired Entrex (CW, April 28, 1977).

It is unlikely to be introduced in the UK because Rediffon's R range of data entry systems is manufactured in the UK under Nixdorf licences.

The other new Nixdorf products will be offered in the UK, but no release date has been set.

## NCR profits up 232% in UK

REFLECTING the benefits of the transformation of NCR from a substantial manufacturer of electro-mechanical equipment to an all-electronic company, the UK subsidiary, one of the last to make the switch, has reported a quantum leap in profits on almost unchanged turnover.

Trading profits for 1978 at £10,263,000 were 232% up on those for 1977, but turnover at £76,649,000 was up only 1.3%. Exports at £22,600,000 were stable.

## Fully decoded RAM from GIM

A FULLY decoded 256 x 4 bit non-volatile RAM is now available from GIM Microelectronics. Designated the ER1711, it is designed for applications where data is constantly changing and needs to be protected in case of a power failure.

The device operates as a normal RAM with a 1.5 microsecond cycle time, and when powering down, a single negative pulse applied to the erase write control line enters the entire contents of the 1K bit memory into associated on-chip EAPROM cells. All stored data is retained for 72 hours minimum after a 1 millisecond write pulse, or 30 days after a 10 millisecond write pulse.

## Liquore Saga

by Don



## Build your own desk-top model

CONSTRUCTION of a desk-top computer which uses a conventional TV set as its VDU is to be described in a series of articles in *Wireless World*, beginning in the April issue, due to be published on March 15.

This computer has two unusual features. First, it avoids the need for a large amount of expensive memory for sub-routines by using two microprocessors. One of these is the MM5710B, which contains all the algorithms necessary to do standard mathematical functions such as square, square root, log, sin, cos, tan, reciprocal etc, as well as 4, 8, 16, 32, 64, 128, 256, 512, 1024, 2048, 4096, 8192, 16384, 32768, 65536, 131072, 262144, 524288, 1048576, 2097152, 4194304, 8388608, 16777216, 33554432, 67108864, 134217728, 268435456, 536870912, 1073741824, 2147483648, 4294967296, 8589934592, 17179869184, 34359738368, 68719476736, 137438953472, 274877906944, 549755813888, 1099511627776, 2199023255552, 4398046511104, 8796093022208, 17592186044416, 35184372088832, 70368744177664, 140737488355328, 281474976710656, 562949953421312, 1125899906842624, 2251799813685248, 4503599627370496, 9007199254740992, 18014398509481984, 36028797018963968, 72057594037927936, 144115188075855872, 288230376151711744, 576460752303423488, 1152921504606846976, 2305843009213693952, 4611686018427387904, 9223372036854775808, 18446744073709551616, 36893488147419103232, 73786976294838206464, 147573952589676412928, 295147905179352825856, 590295810358705651712, 1180591620717411303424, 2361183241434822606848, 4722366482869645213696, 9444732965739290427392, 18889465931478580854784, 37778931862957161709568, 75557863725914323419136, 151115727451828646838272, 302231454903657293676544, 604462909807314587353088, 1208925819614629174706176, 2417851639229258349412352, 4835703278458516698824704, 9671406556917033397649408, 19342813113834066795298816, 38685626227668133590597632, 77371252455336267181195264, 154742504910672534362390528, 309485009821345068724781056, 618970019642690137449562112, 1237940039285380274899124224, 2475880078570760549798248448, 4951760157141521099596496896, 9903520314283042199192993792, 19807040628566084398385987584, 39614081257132168796771975168, 79228162514264337593543950336, 158456325028528675187087900672, 316912650057057350374175801344, 633825300114114700748351602688, 1267650600228229401496703205376, 2535301200456458802993406410752, 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748288838313422294120286634350736906063837462003712, 1496577676626844588240573268701473812127674924007424, 2993155353253689176481146537402947624255349848014848, 5986310706507378352962293074805895248510699696029696, 11972621413014756705924586149611790497021399392059392, 23945242826029513411849172299223580994042798784118784, 47890485652059026823698344598447161988085597568237568, 95780971304118053647396689196894323976171195136475136, 191561942608236107294793378393788647952342390272950272, 383123885216472214589586756787577295904684780545900544, 766247770432944429179173513575154591809369561091801088, 1532495540865888858358347027150309183618739122183602176, 3064991081731777716716694054300618367237478244367204352, 6129982163463555433433388108601236734474956488734408704, 1225996432692711086686677621720247346894991297746881738, 2451992865385422173373355243440494693789982595493763476, 4903985730770844346746710486880989387579965190987526952, 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642775217703596110216784836936465041008881197513117132652544, 1285550435407192220433569673872930082017762395026234265305088, 2571100870814384440867139347745860164035524790052468530610176, 5142201741628768881734278695491720328071049580104937061220352, 10284403483257537763468557390983440656142099160209874122440704, 20568806966515075526937114781966881312284198320419748244881408, 41137613933030151053874229563933762624568396640839496489762816, 82275227866060302107748459127867525249136793281678992979525632, 164550455732120604215496918255735050498273586563357985959051264, 329100911464241208430993836511470100996547173126715971918102528, 658201822928482416861987673022940201993094346253431943836205056, 1316403645856964833723975346045880403986188692506863887672410112, 2632807291713929



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## MICRO NEWS

ONCE a year, the semiconductor industry comes together to talk about some of the latest developments in products and technology and about some of the wider problem areas that face them, at an event known as the International Solid State Circuits Conference. Micro News presents the first of a series of reports on the papers and panel sessions.

## Software is main progress barrier

THOUGH the temperatures outside the Philadelphia Sheraton rarely struggled above 20°F, the discussions within at the 28th International Solid State Circuits Conference often related the temperature, particularly some of the evening panels.

While the main sessions of the conference covered the expanding capabilities of semiconductor technology, the evening sessions broadened the scope considerably.

In particular, the session on third generation high end microprocessors brought into the forefront the importance of software in the systems environments their products are now being designed into.

The panel members represented a cross-section of the business, ranging from the merchant suppliers such as Intel, Motorola and Zilog, to the systems companies within in-house manufacturing facilities, represented by Digital Equipment and Hewlett-Packard.

From Motorola, microcomputer design manager, Gary Denile suggested that the main problem facing the introduction of microcomputer systems was software.

Secondary to this were the difficulties of testing the devices, developing the computer-aided design systems to actually produce them, and finding the necessary capital for production.

The problems of software for micros were perhaps better understood by the systems-oriented companies, according to Duane Dickhut of Digital Equipment. This was particularly true where existing architectures were in use that could be used in lower power systems and equipment.

DEC, he said, manufactured semiconductors solely to provide the building blocks the company requires, which is why it prefers the microprogrammable approach.

This philosophy was backed up by Larry Lopp of Hewlett-Packard, a company that has made a concerted thrust in semiconductor vertical integration as part of its systems activities.

To this, however, Lopp added a problem facing many systems houses, and one that is a neat juxtaposition to the view put forward by Intel chairman Gordon Moore in his keynote address to the conference (CW, February 22).

Lopp suggested that the systems house challenge was also economic, stating that HP for example, while able to define the devices it required, was not big enough to have the economies of scale necessary to produce the parts.

This would especially be the case with VLSI devices, he said, where the design processes were long, tedious and expensive.

Dickhut indicated that DEC might be making a single chip version of its LSI-11 system. He indicated that things are well under way in advanced research, but this did not mean the company might soon be entering the merchant market.

## Analogue chip rouses interest

WHAT has already been christened by one Intel executive as the 4004 of a whole new generation of microprocessors officially saw the light of day at Philadelphia. This was the company's 2820 analogue microprocessor.

Its announcement in the conference programme caused more than a ripple of interest, prompting Wall Street analysts

Benjamin Rnsen, of Morgan Stanley, to hail it as potentially the product of the year (CW, January 4).

The reality is, perhaps, a little less startling than the initial impressions might have indicated, for the device is still very much digital at heart. There has been no fundamental breakthrough to processing data in an analogue fashion.

With the 2820, Intel has basically extended the ideas put into practice with the 8022, 8-bit microcomputer. This has an on-chip A-D converter input capability. To this, the company has also now added a D-A converter output stage.

The major market segment seen by Intel for the new part is in signal processing, and it is obviously looking to the rapid potential growth in communications activities to give it a strong sales base.

Due to be sampled during the second or third quarters of this year, the 2820 as described at the conference incorporates on-chip A-D, D-A conversion, 192-bit word EPROM, a scratch pad RAM, an arithmetic unit, I/O sample and hold circuits.

The architecture of the device is oriented towards real time processing of digitised samples of analogue inputs, making it suitable as a variety of communications signal processing sub-systems, such as modems, multifrequency tone receivers and process controllers.

For each application, the chip can be customised by programming the EPROM, which controls the operation of both the A-D and D-A portions of the device, and the digital processor

would certainly be greater than 250 miles per mile, but under 300 miles.

This will give a chip area of between 62,500 and 90,000 square miles, making production yields critical for the company, and making the part very expensive initially.

Denile went on to claim that the 68000 processor would rapidly track the area reductions now being achieved with Motorola's 6800 family, and that within three years, standard photolithographic techniques will have brought the chip area down to about 25,000 square miles.

First silicon on the 68000 is expected by the middle of this year.

Harris will gain 49% of the equity, but its only investment will be in the provision of technology. This is likely to centre around Harris' self-aligned, junction-isolated CMOS technology, which can operate up to 40 MHz.

A UK designed printer that has very aggressive pricing for the features offered has been introduced by J. A. Walters, a High Wycombe-based manufacturer. Named the Dolphin B280, marketing is initially being carried out by Dialog Marketing of Marlow.

With a unit price of £575, it is an 80-column, line printer offering the full ASCII 96-character set. It accepts standard 9.5-inch continuous roll-feed stationery, which can be printed in a 10 character per inch, six line per inch format. A

400 character buffer is also included.

Band rates are switch-selectable between 110 and 9600 baud, and the unit conforms to CCITT V24 and RS 232C standards.

Mostek 3870 updated

MOSTEK has introduced a new version of its 3870, 8-bit microcomputer that incorporates a new Double-Dip package concept that allows the package of up to 4K bytes of PROM.

The technique gives the package a meaning to the phrase "chip on board PROM", for the package for the new micro, called the 3874, carries the PROM on its back.

A standard 24-pin DIP with memory latches and a built-in 1K to the top of the package and, depending on the device chosen, also contains an emulator one, or a family of other microcomputers.

Memory boards

A COMPLETE set of memory boards for all Digital LSI-11 based computers is now held by Data Dynamics. The boards are PDP-11/70S and PDP-11/70S, for which systems, for which most popular boards are available.

## Keeping an eye on leasing policy and practice

Despite the fact that he has expressed extreme pessimism about the future of the computer leasing business, Parry Mitchell, chairman of United Leasing, has been elected president of the European Computer Leasing and Trading Association, Eclat, which was established last year (CW, November 23, 1978).

Eclat now has 28 members who together account for most of the business done in Europe by third party lessors and used equipment dealers, and as a group is the largest customer in

EXPLAINING Eclat's aims, Parry Mitchell, chairman of United Leasing told Computer Weekly, "One of the main reasons Eclat was set up was to put pressure on IBM to change its practices in Europe, and although I am not sure exactly why Eclat made me president I think it was because I feel strongly about the IBM side of the leasing business."

"One of the intentions of Eclat is to formally ask the IBM World Trade to publish and distribute all its European rental and lease prices in a consultant's handbook similar to the handbook already available in the US."

"The Association will also ask IBM to make all its prices freely available to the public. At the moment IBM only reveals its rental and lease prices to prospective customers."

Eclat also intends to bring alleged violations of established IBM policies committed by IBM

4300 machines to keep their options open because they are confused about IBM's strategy with the 4300 series. It has caused maximum confusion, I think IBM sees the 4300 machines mainly as super minicomputers for distributed processing by big customers who will link them to 303X mainframes initially and to H series systems later.

"I do not think the difference between 303X and H series will be enormous. The attached processor just announced for the 3033 is a significant enhancement. But if the H series turns out to be a very expensive, massive beast it might be worth leasing, although it also depends on how IBM structures its rental."

Parry Mitchell has already expressed his belief in Computer Weekly that there is no real future in leasing computers because of their rapidly declining

cost and his views on the matter remain largely unchanged.

According to the Equipment Leasing Association, the organisation that represents most types of lessor in the UK, computer and office equipment assets acquired by UK lessors last year were valued at £244 million, compared with £164 million in 1977, and assets owned at the end of 1978 came to £280 million, compared with £487 million.

Mitchell attributes this boom in business partly to an increase in finance leasing, where the lessor takes no risk, and also to the greater availability of IBM machines for leasing following IBM's introduction of its Sale of Installed, SOI, scheme to the UK early in 1978 (CW, January 5, 1978).

Under SOI an IBM rental customer can buy his machine from IBM after 18 months or more, and a significant amount is knocked off the full purchase price — up to 60% depending on how many "rental credits" he has built up. During 1978 some third party lessors persuaded a lot of IBM rental customers to exercise SOI and to immediately re-sell their machines to the lessors and take on operating leases.

On the Lloyds insurance controversy, Mitchell commented, "The Lloyds thing is horrific. The Lloyds have been offering a residual value policy, and I personally believe the losses involved could be between £300 and £400 million."

Europe for new IBM equipment. The lessors all specialise in writing operating leases which involve having to estimate the residual value of a machine and remark it at the end of the lease period — a considerably more risky business than finance leasing.

Here, Parry Mitchell (pictured right) talks to KEITH JONES about his interest in Eclat and also expresses his views on IBM's recent announcement of the low cost 4300 series.

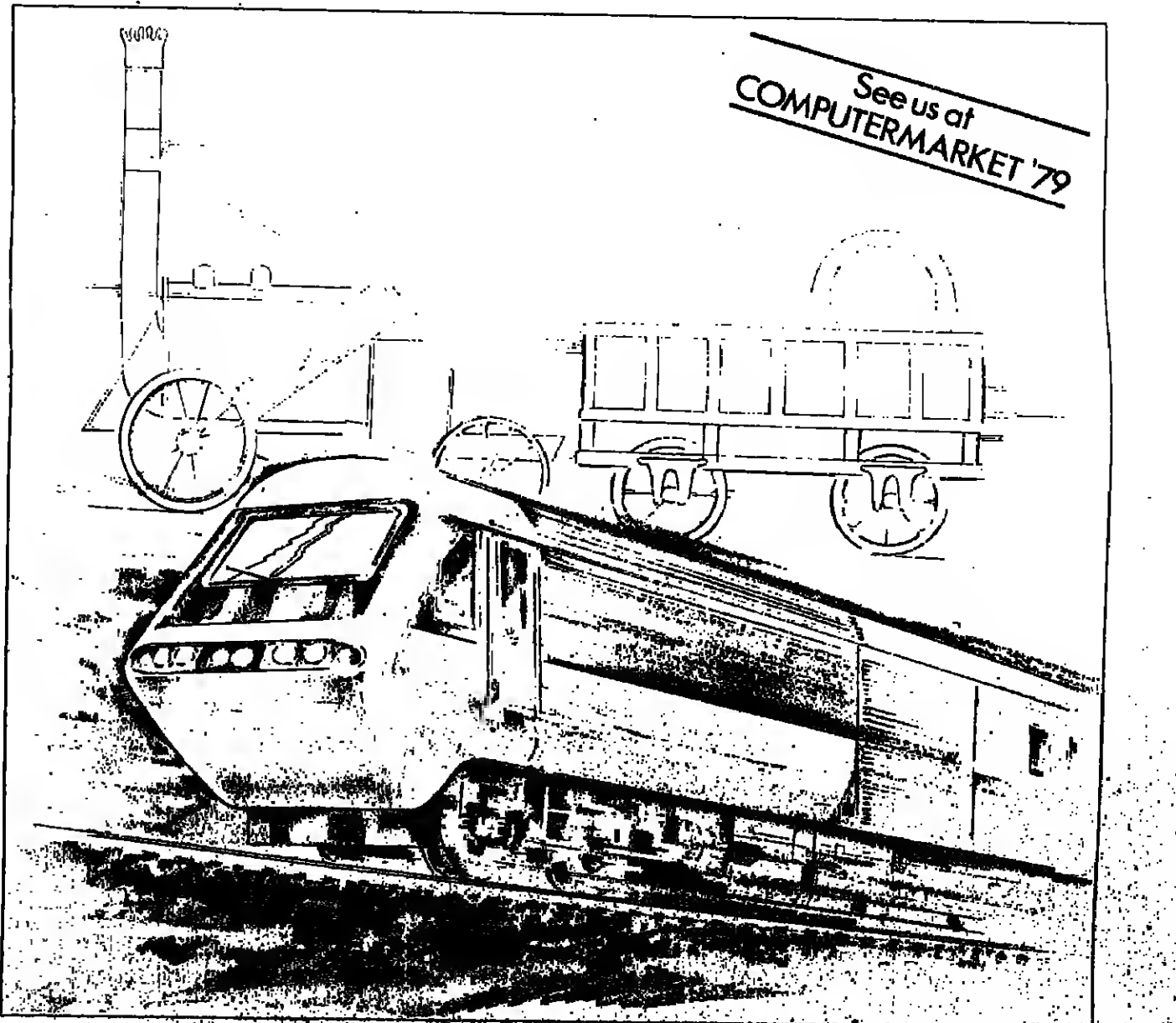


"I also believe that Lloyds will bite the bullet and pay out the lot because most of the policies were written for US leasing companies, and Lloyds are now under attack from the proposed New York insurance underwriting institution that could take a lot of US business from them. Lloyds must not be shown to be tardy in their payments."

"In 1973/74 some major banks in the US starting using the Lloyds policy to overcome Regulation Y of the US Federal Reserve Bank which says that a bank must not assign a residual value of more than 20% on equipment under any one operating lease and no more than 10% overall on all such leases. The Lloyds policy was accepted by the FRB and the banks involved used it without

taking great risks. "But then around 1975/76 some third party lessors saw the Lloyds policy as a means of offering customers long leases with early break clauses involving a great risk, because the risk was covered. So the lessor could get a loan from a bank and make a big profit on the deal, immediately, even allowing for the interest due to the bank. It

was a licence to print money and they went wild. "Lloyds should have realised that they were encouraging investment in IBM 370s well beyond the date that it was prudent. In the US now a 370-158 is being returned to a lessor nearly every day. In addition, about 10% of the machines covered by the Lloyds policy are in Europe."



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As online systems grow, so also does the commitment to network reliability. In the US, data processing managers find that one of the most useful tools for minimising system downtime is the

"tech control centre" which serves as a focal point for monitoring the network, diagnosing problems, isolating faulty lines and equipment and restoring the service with minimal delay.

MORRIS EDWARDS (right) gives some hints on setting up a centre, and describes some of the latest tech control equipment on the market, comparing their ways of working.



multipoint control in the hands of a single central site operator. In 1976, it announced a "second generation" system, the NCS-4000 network control system, for handling online distributed processing systems. Then, early last year, the firm unveiled a fully automated network control system, the EMS One, which adds automatic monitoring and scheduled, unattended testing capabilities to network control systems. Also, the new system can "query" the network automatically, learn its configuration and build a disc-

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## 'Tech control' key to network reliability

ONLY a few years ago, the task of putting together a tech control centre was a minor undertaking, since the bulk of the equipment had to be tailored to the user's specific requirements. Today, the centre can be quickly implemented out of standardised patch, switch and monitor modules at little cost per channel.

What is more, the modular systems allow users to expand the centre in pace with the network's growth.

Typically, switch modules connect in series between a single modem and two terminals, say. With this arrangement, the modem may be switched to either its primary terminal or the back-up simply by flipping a front-panel switch. Similarly, fail-back switching can be provided for primary and standby modems or dual front-end processors.

Putch and monitor modules also connect in series between the terminal and modem, and the modem and communications line.

For monitoring or testing purposes, the patch module is switched to a patch mode, which breaks the connection between the modem and terminal or modem and line, so that the test can be patched into the link.

In this way, the test set can replace the terminal, say, and can send a pattern into the modem for transmission over the data link.

This test pattern may be looped back at any convenient point in the link; by changing the loopback point, successive tests can be performed to pinpoint the location of the faulty unit.

Much of the development work in these centres now focuses on providing central site management of multipoint networks.

Central site control is needed in such networks because a lot of locations do not have the trained technical staff required to perform the diagnostic procedures and to rectify faulty conditions. Also, whereas isolating network problems is more complex and time-consuming with multipoint configurations, speedy restoration of network operations is critical since multipoint networks are commonly used in banking, reservations and similar real time applications.

Further, whereas the failure of one terminal, modem or line in a point-to-point network only disrupts service to one remote facility, a similar failure in a multipoint network halts communications with all remote network points behind it.

To provide the central site's diagnostic capability, modem vendors make use of a secondary, or "out-of-band", channel to carry the monitoring and test signals. With a standard voice-grade telephone line, the channel frequency spectrum runs from about 300 Hz to 3.3 kHz.

Since a 4,800 bps modem typically employs a bandwidth of about 1,800 Hz spread around the centre frequency, there is ample spectrum at the high and low end to take a secondary channel.

By transmitting the diagnostic signals at the same time as data, and over the same link, users can monitor and troubleshoot without disrupting network operations.

To handle diagnostics throughout the network, the central site employs a master controller that communicates with the remote modems over the secondary channel.

Each modem has a unique address so it may be individually interrogated by the controller. Addresses and commands are generally entered into the controller via either a keyboard or switches. A display shows the results of tests or monitoring sequences.

Through the controller, users have the capability to: 1. Monitor the status of remote units; 2. Diagnose a network problem and isolate the faulty unit; and, 3. Restore network operation while the failed element is being repaired or replaced.

Monitoring may be continuous or selective. In the former mode, the controller polls each remote site over and over to check for modem streaming, to determine the status of the modem's signal quality leads or selected interface leads, to confirm line continuity or to verify whether power is on or off.

When the controller detects abnormal conditions, it sounds an alarm and displays or prints a report on the fault.

In selective monitoring, the user identifies certain locations that are suspect, and these are checked out repeatedly. Also, selective tests can be conducted once a fault has been isolated by continuous monitoring or by other diagnostic procedures.

Diagnosis begins with a standard point-to-point procedure: a modem self-test and analogue and digital loopback tests.

Restoral functions generally include dial back-up, spare modem switching and speed reduction without the intervention of remote site personnel.

To disconnect a malfunctioning modem or terminal, the controller sends a command to disable the modem's data channel transmitter.

In this way, the secondary channel stays active so that monitoring, diagnostic and restoral activity can continue. When the problem is corrected, the controller enables the remote modem with a restoral command.

For dial back-up, full duplex

systems require two dialled connections and a line sharing device. This transmits outbound messages and detects incoming traffic on a contention basis.

Dialling may be manual or automatic. Critical remote sites may be equipped with "powered" spare modems, which the controller can switch into the network to take over from a malfunctioning unit.

Speed reduction refers to the ability of modems to function at a lower data rate to permit continued operation in the face of degraded line quality.

When line quality deteriorates to a threshold level, the controller automatically switches all modems on a particular multipoint link to the lower data rate, restoring the system to the normal rate when the line quality improves.

Speed reduction often occurs in dial back-up operation, since the quality of dial-up lines is often well below that of leased facilities.

The pioneer of multipoint network control systems is Intelnet Inc, represented in the UK by Cossor Electronics. In 1973, Intelnet introduced the first integrated package of diagnostic gear, modems and remote control restoral hardware to place

multipoint control in the hands of a single central site operator. In 1976, it announced a "second generation" system, the NCS-4000 network control system, for handling online distributed processing systems.

Then, early last year, the firm unveiled a fully automated network control system, the EMS One, which adds automatic monitoring and scheduled, unattended testing capabilities to network control systems. Also, the new system can "query" the network automatically, learn its configuration and build a disc-

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## VAX: "An implementor's dream."

Dr. Brian Ford, Director, Numerical Algorithms Group  
Oxford, England/Downers Grove, Illinois



## A novel approach to multipoint network management

From page 14

without any operator intervention — a feature called "self learning."

In automatic monitoring mode, the EMS-One continuously polls all active lines and reports changes of status to the operator with both visual and audio alarms. The system maintains a list of all faults that remain uncorrected for the operator to view at his discretion.

Scheduled, unattended testing is accomplished in the automatic predictive maintenance mode, which allows the operator to initiate on- and off-line testing of any or all lines at specific times of day. Results are recorded by the console printer, allowing unattended operation during off-hours.

These hard copy records can be subsequently used as an indicator of trends in equipment performance for predictive failure analysis.

Another leader in network control is Codex, represented in

the UK by Cole Electronics, whose multipoint network control system comprises a central site master control console and remote card modules that insert in any of the firm's Fast-Poll series modems.

MNCS operates through a frequency division multiplexed FSK secondary channel to handle two main functions: isolate the malfunctioning network element, and restore network operation through alternative facilities. It can control up to eight separate multipoint lines, with up to 30 drops on each.

A keylock switch selects monitor, test or configuration change mode. Stringent error control is used with the latter two modes to prevent execution of false commands.

Unlike other network control systems that only work with the vendor's own modems, General DataComm's Netcon-5 operates with any multipoint network employing modems compatible with Bell 201, 202 or 208 types.

The system can address over

10,000 remote stations and automatically run a series of tests to determine station status without interfering with the network operation.

Continuous monitoring may be interrupted to perform specific on- or off-line tests. For distributed processing networks, a diagnostic subsystem permits multilevel addressing. General DataComm is represented in the UK by IAL Data Communications.

In a novel approach to multipoint network management, Paradyne Corp utilises the microprocessor in its latest multipoint modem to provide extensive diagnostic capabilities at each drop in the network.

Part of the microprocessor's function in the modem is to rapidly and accurately measure and analyse various transmission line impairments.

In its Analysis I system, the firm (represented by EMI Technology) uses a network interrogating procedure to automatically analyse this diagnostic data from every network drop

on a continuous and non-interfering basis.

Numerous categories of data are received from each drop and are compared against predetermined acceptance criteria. All non-acceptable states are immediately displayed on the operator's console, along with recommended restoration procedures.

Having decided on a remedial action, the operator can then use the Analysis I system to implement the decision.

Racal-Milgo's System 180 network diagnostic controller can check out 16 lines, each with up to 254 stations. It uses a secondary 75 bps FSK channel to scan automatically and report station status without interrupting network operation. The firm offers a mass storage device for logging exception reports from remote sites. Also, to simplify testing, the console can display action commands in logical sequence to prompt the operator to follow system test guidelines in isolating a network problem.

The greater use of technology in banking would allow the banks to increase and improve the services available to customers. And the only reason it was not happening now was that technology was moving too slowly.

There is some doubt, however, whether banking with its capital markets, can be considered as representative of the potential of all service industries.

The opinion was that there was a consensus opinion during the conference was on the education of future generations. All agreed that fundamental changes were necessary, and required quickly, as the general level of skills required in industry and commerce was liable to be much higher than now.

Alan Benjamin of the CSA highlighted the current situation by saying that there was a shortage of staff in the computer industry of some 25,000 people, without counting the number of jobs being created by microcomputer-based opportunities. In 1978, however, the output of computer science graduates from our universities was just 1,400.

In addition, he suggested that the teaching they received was in fact inappropriate to the real world, for they had no knowledge of other industrial or commercial disciplines.

The concept of education could also be revised as part of a process of absorbing the "unemployed" in longer term educational activities.

This is a view supported by Jenkins, who suggested that our educational system should now perhaps be aiming at achieving a totally graduate population, with a school leaving age raised to 25.

COAL-MINERS will in future find the task of stripping a coal seam from surrounding rock much easier if research into microprocessor controlled mechanical cutters proves successful.

An Interall 6100 based system is being designed at the National Coal Board's research centre at Bretby, near Burton-on-Trent. It

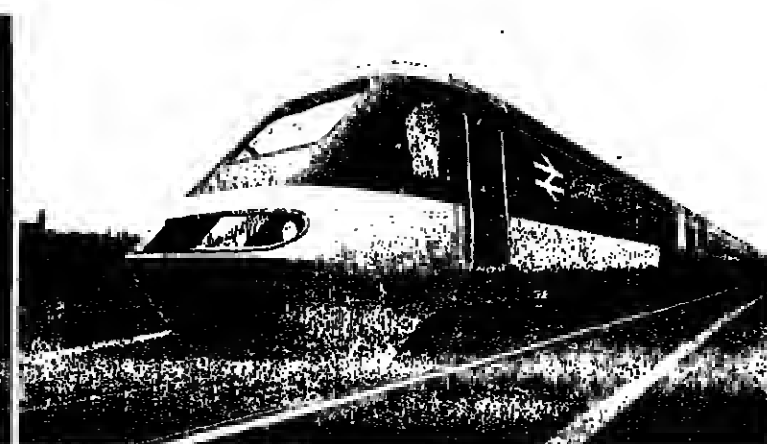
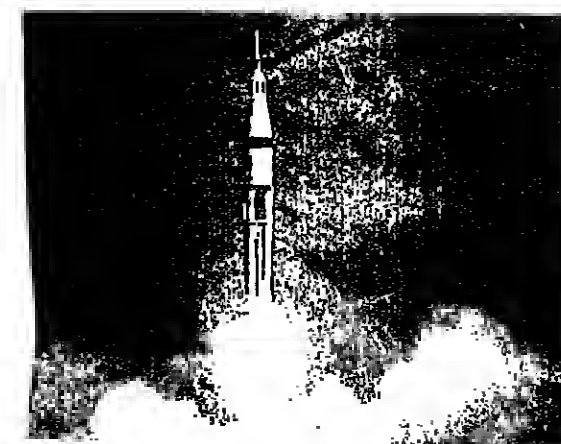
is planned for delivery to Baddiley Colliery in July and will track each coal seam by means of special detectors — radiation sensors to pick up the ambient rock radiation in strata above and below the seam being one option. Expected advantages are more production and less wear on the blades, as less rock will be cut accidentally.

Six-lane vehicle counter

A VEHICLE counter that can handle data from six lanes of traffic simultaneously has been introduced by the Golden River Company of Bicester, Oxon.

Called the Marksmen, it is based on an RCA CDP 1802 CMOS microprocessor.

Data can be collected from up to six induction loop sensors



For the Numerical Algorithms Group, the plain fact is this: "Software implementation was faster on the VAX-11/780 than on 25 other major machines."

Before VAX, Dr. Ford's staff had implemented NAG's complex FORTRAN Mark 6 Library on 25 major machines ranging from minis to mainframes, including the Burroughs 6700, CDC7600, Univac 1100, and IBM 370. The average implementation time was 13 man-weeks.

VAX took five. In Dr. Ford's words: "The NAG FORTRAN Mark 6 Library consists of 345 subroutines covering the major areas of numerical mathematics and statistics. It's used in applications such as structural design, nuclear physics, economic modelling, and academic research.



"A successful implementation requires the correct functioning of the 345 library routines to a prescribed accuracy and efficiency in execution of NAG's suite of 620 test programs. Whilst the activity is a significant examination of a machine's conformity to the ANSI standard of the FORTRAN compiler, its main technical

features are file creation, file comparison, file manipulation and file maintenance."

And then there was the record of VAX reliability: "No problems were encountered in the VAX/VMS software even though approximately 3000 files were being handled. The operational availability time for the machine was close to 100%, an outstanding statistic for new hardware and a new operating system."

What all this demonstrates is that some of the most sophisticated FORTRAN routines in the world implement easily on VAX. That VAX capability exceeds that of many machines far more expensive. That the VAX-11/780 is more than the most powerful 32-bit computer in its price range. That VAX is truly "an implementor's dream".

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### MICROS AND JOBS CONFERENCE

## Jenkins points to riddle of where work will be created



CLIVE JENKINS, general secretary of the white collar union ASTMS, told a one-day conference on Microprocessors and Jobs that there was considerable difficulty in assessing the areas for job gains, while it was possible to calculate potential job losses over the next 11 years.

Though many speakers at the conference, organised by Online, could pick their way through the multiplicity of ills currently facing UK industry and commerce as good reasons for the need to start using microelectronics, few offered the audience a consensus view of the type of direct action that might be needed.

This was exacerbated by the fact that a large percentage of the audience was drawn from within the DP industry itself, an industry that has lived with the concept of its own impact on society and for many years.

The potential for de-industrialisation in the UK via the activities of its competitors, is well-charted water in the micro debate, and the opportunities for unemployment — and attendant social unrest — are well known.

Jenkins pointed out that the number of unemployed was no longer directly tied to the economic performance of a nation. He pointed to West Germany, with 1.1 million jobless even with reasonable economic growth. Current estimates pointed to a UK figure of about 4.5 million by 1980.

Ray Currow, of Sussex University's science policy research unit, agreed that there would be severe employment dislocation, but suggested that the micro was not the fundamental cause of it. Rather, he suggested, it was the state that broke the family back as structural unemployment was nothing new.

So how should the unemployed be coped with? Several of the union speakers stressed the need for much greater co-ordination and effort in manpower planning in companies.

John Lloyd of the electricians' union said that the biggest need was for good, long-term communications between employers and employees on new developments and potential job losses and changes.

He admitted that many unions were frightened by the potential of the micro, so working it out now would stop the inevitable social upheaval.

This view was supported by Industrialist speakers as well. Geoffrey Souter, personnel director of ITC Consumer Products said that co-operation could solve many problems.

His own company, which has gone through several traumatic changes due to foreign competition, had found employing a full-time manager to look after the interests of staff and provide counselling services had been very beneficial. The real cure, though, was for the company to search continually for new product opportunities.

A favourite "sponge" touted to soak up the future unemployed is the service sector and

is planned for delivery to Baddiley Colliery in July and will track each coal seam by means of special detectors — radiation sensors to pick up the ambient rock radiation in strata above and below the seam being one option. Expected advantages are more production and less wear on the blades, as less rock will be cut accidentally.

Six-lane vehicle counter

A VEHICLE counter that can handle data from six lanes of traffic simultaneously has been introduced by the Golden River Company of Bicester, Oxon.

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## AMI wins SBS page-a-second scanning deal

THE contract to develop two prototypes of a high-speed computerised data-scan facsimile system for the IBM Satellite Business Systems joint venture has been won by AMI International, despite fierce competition from Fujitsu of Japan.

Under the contract, AMI International, which recently changed its name from Addressograph-Multigraph, will deliver two prototypes early next year. The requirement is a system which takes one second on average to scan an A4 page, and another one second to print it out at the receiving end.

The system thus needs a capacity of 3,600 pages an hour. This quantum leap forward in transmission speed is made possible by the ultra wide bandwidth which SBS will be offering users, in the 12-14 GHz band.

Use of this band will also en-

able the system to operate with roof-top antennae at the user site rather than communal satellite ground stations. Just as television aerials in the UHF band are much smaller than VHF TV aerials, so the microwave dish aerials used with satellite transmission get smaller as the frequency increases.

Another contract in connection with Satellite Business Systems, for the terminating equipment for computer-to-computer links over the satellite network, has been awarded to Bunker Ramo. In each case the contracts are for prototypes only, and users will not be restricted to equipment supplied by the chosen companies. Clearly, however, award of the prototype contracts will give the successful bidders a head-start over the competition.

Satellite Business Systems is a joint venture between IBM, Comsat and the Aetna Insurance company. Despite court action intended to smother the project at birth on anti-monopoly grounds, Satellite Business Systems hopes to begin service in January 1981, offering users high-speed intra-company transmission facilities for voice, data, facsimile and closed circuit television.

## PO buys second Tesdata monitor

A SECOND Tesdata performance monitor has been bought by the Post Office data processing service. An MS88 system, valued at about £100,000, will be used at the Harmondsworth processing centre which runs equipment including an IBM 370/168, an ICL 2960, and three ICL System 4/70s.

The Post Office was the first customer in the UK for Tesdata's MS 38 monitor (CW, October 14, 1978) and has since used it in 15 major studies. Tesdata sales in the UK last year topped £1 million.

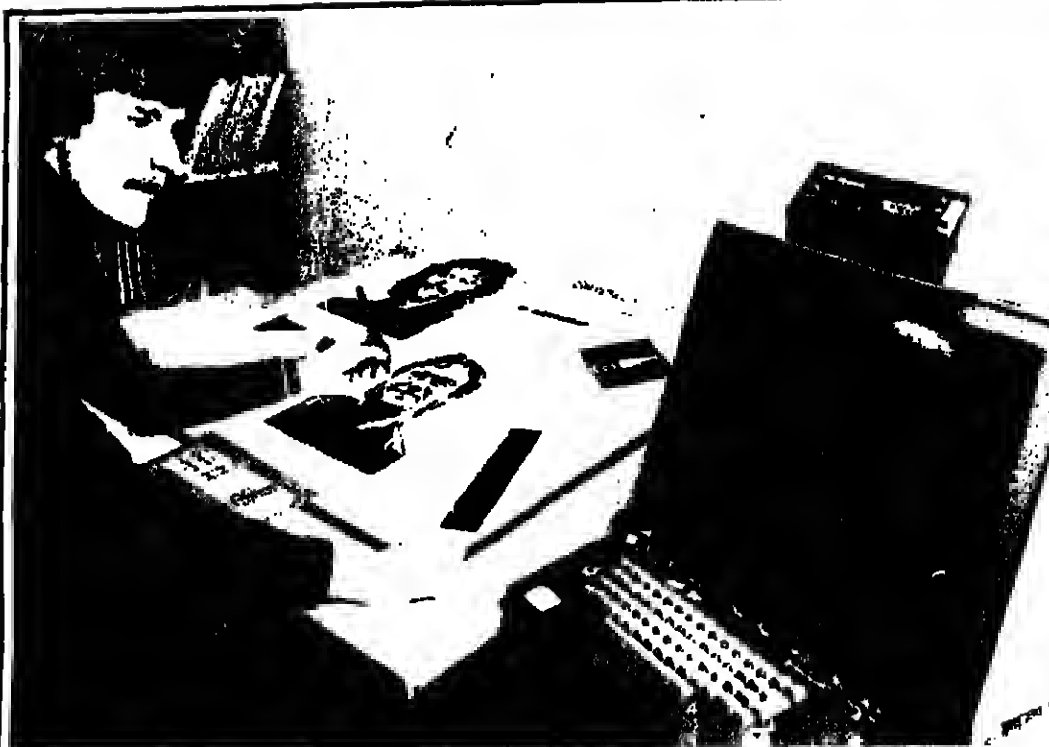
## London firm develops system to monitor telephone exchanges

A COMPUTER-CONTROLLED system for monitoring large telephone exchanges has been developed by the London-based systems house Xoren Computing. Called the TMS-11, and based on the Digital Equipment

PDP-11/34, a major aim of the system is to help improve the efficiency of telephone networks by speeding-up fault diagnosis. A key function is the ability to display a dynamic map giving detailed information about

specific sections of the network. In addition to the processor, a typical TMS-11 configuration would include discs, one or more VDUs, and an interface unit into the network.

The software supporting the system was first developed by Xoren under contract with the British Columbia Telephone Company, Vancouver. Typical prices for a complete turnkey system are between £250,000 and £500,000.



## Antics that speed TV cartoon films

THE making of cartoon films for television has been greatly simplified by the development of a computer-based animation system at Grove Park Studios, Cumbria. The system, called Antics, is now in use at the Swedish Broadcasting Corporation on a Univac 1100/11.

Conventional cartoon production requires the drawing by hand of enormous numbers of individual pictures. Antics helps get round this by enabling the artist to supply a few pictures of key positions of, say, a human figure walking along, and to have the intervening pictures supplied automatically by the machine. The completed sequence is displayed on a VDU and can be corrected if desired. It is then recorded on analogue videotape.

Initial drawings are digitised using a plotting table and a special light pen, as our picture shows, and

while this is going on the drawing can be seen growing on the screen.

About 40 different operations can be performed on the completed drawing, such as enlarging, turning, reversing, and skewing, and sequences can be produced in which it rotates, rocks, and so on.

Over 100 separate coloured elements can be manipulated in one sequence, all moving in different ways.

All told, a film that would otherwise take six months to produce can be put together using Antics in a few man-weeks, the Swedish Broadcasting Corp claims.

The Univac machine is also being used for allocation of studio resources, scheduling records, and keeping track of programme royalties.

## ACT sees 4331 as a loss leader

HIDDEN additional costs to IBM 4300 line reduce its apparent improvement in performance, but the machine still poses a substantial threat to competitors, with the new lease causing particular problems.

These are among the conclusions reached in a new industry Measures special study, Competitive Analysis of the IBM 4300, published by Advanced Computing Techniques of New York.

"On our assessment, the performance improvement achieved by the 4300 has been grossly over-estimated," ACT's Bob Fertig told Computer Weekly.

"They have been calculating on a processor and memory basis rather than a system basis. The improvement comes between 1.5 and 3 times that of previous models." (These rates align with comparative data published in Computer Weekly on February 22.)

"We see the 4331 as a leader, priced on the same basis as the System 38, and designed to win over System 3 users: IBM's Data Processing Division.

"But the real impact of competition will come out of the new technology battles: two-year lease, Compag's DEC, Univac, Burroughs, Honeywell and so forth. Five-year leases to maintain their cash flow," he said.

He also expects IBM's wire and maintenance costs to rise 10% a year anyway, and perceives a significant hidden cost to 370 users: conversion of files to the fixed block mode architecture.

ROBIN WEBSTER reports on the DP scene in Iran

## US firms count the cost—and plan to go back

WHILE US computer companies still count the potential cost of their activities in Iran, a more detailed picture of the country's computer sector has emerged from Western advisors airlifted out.

Following the turmoil there, contracts between the pre-Khomeini government and US companies valued in excess of \$7,000 million have either been nullified or jeopardised.

Many of the contracts relate to the provision of electronic systems or weapons incorporating such systems, and although some losses have been made, many US computer companies are eager to return.

The question is whether, after the Ayatollah's demand last week that all Western and Communist influences should be removed, Iran will give US companies the chance to go back.

One part of the answer may lie in the fact that Iran needs Western technology and Western technicians to operate it. The second part, which supports the first, is that although companies like Control Data and Honeywell removed all their non-Iranian staff when things got tough, steps have been taken, with Iranian involvement, for the continued support of equipment in use.

In CDC's case, it airlifted out about 30 non-Iranian nationals in December but still operates an "as needed" service for machines in Iran from a centre in Brussels.

"CDC has continued to receive payments for its services and equipment in Iran," said a US spokesman, "and we hope to continue business activities there. We have not cut off links with the country."

Honeywell too will go back when possible, said a company spokesman in Italy.

"We evacuated the last seven of our staff from Iran about three weeks ago," he said, "but we have every intention of returning. There is no question about that."

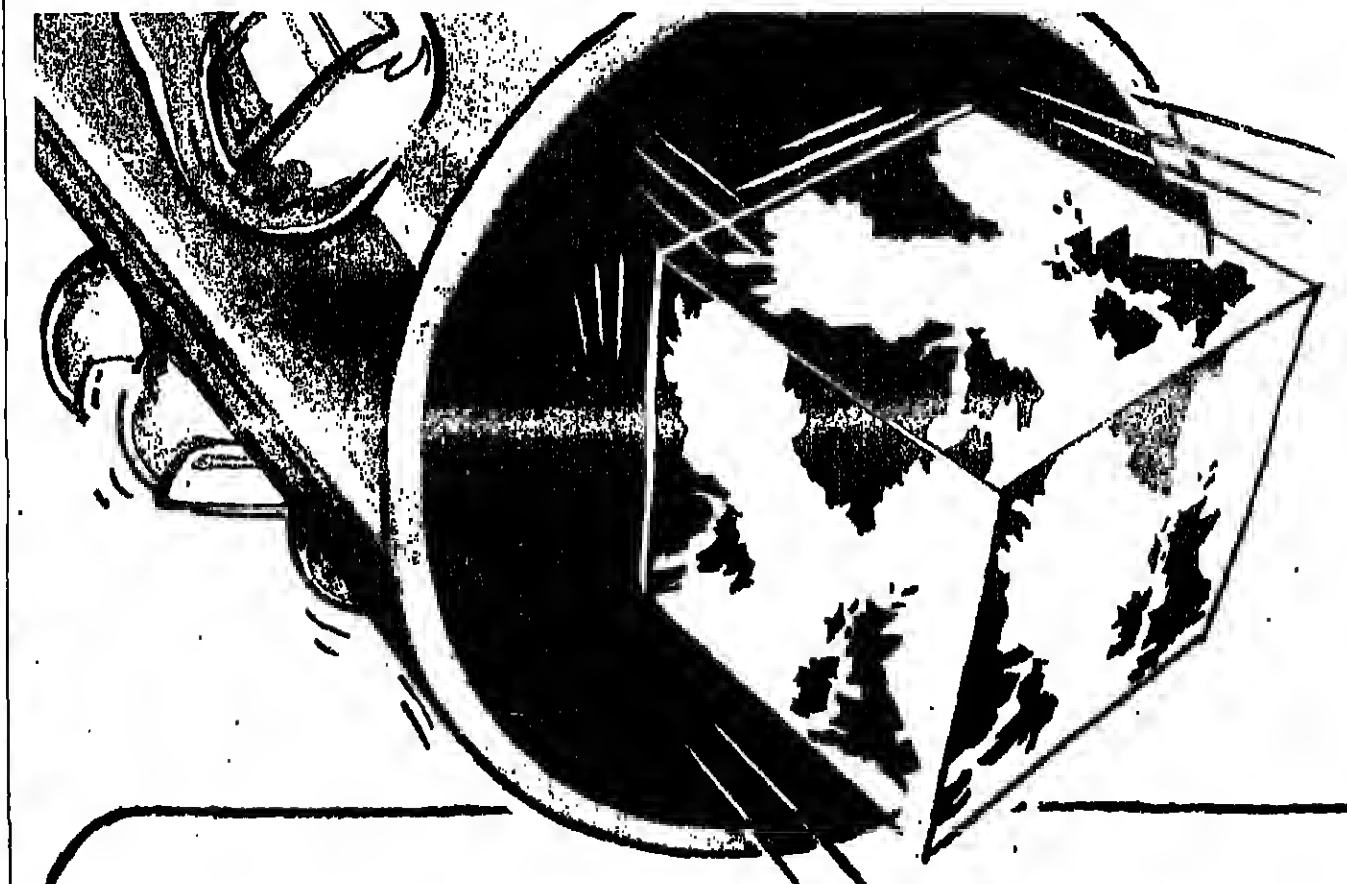
One company which has revealed its losses is Electronic Data Systems, the management facilities company led by former IBM salesman Ross Perot, which is said to have lost most of the \$20.5 million it was to have received for the installation of a national health insurance and social welfare system under contract to the Iranian Ministry of Health and Social Welfare.

In addition to this loss, Perot had to bear the cost of airlifting out two of his employees being held in Tehran's Gase Prison. This was achieved by the use of a team of ex-US commandos who bought the services of Iranian revolutionaries to storm the prison and release the men.

As for equipment already installed, EDS has had to face the fact that the Iranian government, which was reported to be about \$5 million behind in payments, is not likely to settle in full.

With more than a little US influence, the tendency appears to be one of using brute force methods to process what in the West would be looked upon as standard jobs.

It was not a case of machines being oversized by only three to four times, said one US source, "but differences of up to 5,000% could be seen. A lot of money was squandered on computers far too powerful for their applications. This was not so much due to the gullibility of the Iranians, but more to the hardness



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# COMPUTER WEEKLY



# 1978 vintage year for DP industry

ANNUAL results from Burroughs and Control Data and third quarter figures from Sperry Rand emphasise that 1978 was an exceptionally good year for computer business.

Burroughs' net profit rose 18% to \$253 million on turnover up 16% at \$2,460 million, with sales up 17% and rental and service income up 14%. Pre-tax profit margins improved from 18.5% in 1977 to 19.3% in 1978.

Underlining the gathering pace of new product introductions, Burroughs' chairman Paul Mirabito reported that the current year would be a significant one for new Burroughs machines.

Since he spoke, the company has launched its "900" family with two mid-range models, the B2830 and the B3950.

At Control Data, everything in the garden looked rosy, with profit up 42% at \$89.5 million on turnover up 16% at \$2,700 million.

Both computer business

and the Commercial Credit Insurance subsidiary contributed to the growth, but the profits in the computer business were particularly strong, rising more than 100% from last year's \$20.2 million to \$41.3 million.

Promising good earnings for the future, the company's rental base rose 21%, while OEM sales of peripherals were up a formidable 56%.

Confirming CDC's strength in education and computer services, this sector of the company's business reported turnover 18% ahead at \$395 million.

Sperry Rand Corp's financial year ends in April but for purposes of comparison also gives a figure for the 12 months to December 31. In this period, the company achieved 30% increase in net profit to \$214 million on turnover up 17% at \$4,085 million.

Univac represents about 50% of the Sperry Rand total, and the company reports that in the October-December quarter,

orders rose 24%, turnover rose 21% and orders in hand rose 10% over the comparable quarter in 1977.

Minimaker Prime stormed ahead, with net profit up 114% at \$8.4 million on turnover up 87% at \$93.5 million. It is confident that annual sales will continue to increase at an average 60% over each of the next four years.

Supercomputer specialist Cray Research benefited from a \$900,000 tax-loss carry forward to report net profit up 75% at \$3.5 million on turnover up 61% at \$17.2 million. It also reported that the Cray 1 computer at the European Centre for Medium Range Weather Forecasting, previously leased, has now been bought outright.

## Chaucer venture

In a joint venture two Canterbury firms, builders Robert Brett and Sons, and Invicta Motors, have set up a computer service company called Chaucer Computer Services.



## Cincinnati minis base for small business systems

SMALL business systems based on the Cincinnati Milacron range of minicomputers are to be manufactured and marketed by Cinsal Computer Systems, a new company formed jointly by software houses Rubicon Computer Systems and Data Networks.

After Cincinnati's first attempt to sell its commercial systems division to CSD International, a company set up by Milacron employees (CW, June 28, 1978), Rubicon and Data Networks stepped in with their bid. This was accepted and now Cinsal is to take over Cincinnati's European customer base while the US company turns its attention to numerical control.

The equipment Cinsal will market, under its own name, includes enhanced versions of Cincinnati's System 20 Intelligent terminal and System 40 and 70 disc-based minicomputers. Manufacturing will be carried out in the old Sunshine Bakery depot in Littleborough and 20 staff will be employed initially.

## Conflict inside IBM 'exaggerated'

THE conflict between IBM's Data Products and General Systems Divisions is exaggerated, believes Aharon Orlansky, analyst with New York stock-brokers Oppenheimer and Co. Talk of conflict has been spurred by competitive announcements from DPD and GSD over the past six months, such as DPD's 4331 and GSD's System 38, and the DPD 8100 which is designed to handle communications applications for which the GSD Series 1 mini has been offered.

Commenting on the clash between System 38 and the 4331, Orlansky noted that the relationship database of the 38 was not suited to large-scale machines because it pre-empted too much of the CPU power.

"I expect IBM top management to limit the power of the largest GSD machines to prevent conflict," he told Computer Weekly. "IBM wants GSD to remain predominantly in the small companies market for which it was established."

"The two divisions operate in quite different ways. DPD salesmen have access to top management in large corporations, whereas GSD salesmen are confined to data processing or management services managers."

## Controlling stock

UNIT Pellets of Gölborne, Greater Manchester, has ordered a 128K byte Computer Technology CTL 8020 minicomputer to use for stock and materials control. The £40,000 system will also perform accounting functions including order book and sales and purchase ledgers. Due for delivery in the spring, the system includes two 10-Mbyte disk drives, three VDUs and a 240

DIRECT handprint data entry with Quest Datapad is now being used by three clerical staff at Media Expansive Analysis Ltd to capture information on 1.5 million advertisements a month that appear on television or in the Press.

The Datapad system MEAL has 18 stations linked online by a Data Generator New 3 computer which records data on magnetic tape and interacts with each operator, checking on factors such as character sequence, field length and document sequence.

Before the Datapad system was installed, information direct to that now being captured directly was prepared on source documents and then punched on to cards. The Datapad system enables MEAL to supply its customers — manufacturers, media owners and advertising agencies — with the information more quickly.

## NEWS IN BRIEF

### Marketing switch

RACAL-MILGO has taken over UK marketing of medium speed UK machines made by its sister company Racal-Vadic in California. Racal-Vadic is a subsidiary of Racal, a major supplier of electronic equipment, whose agreement with Vadic was terminated when Racal took over Vadic last year (CW, April 6, 1978) relinquishing its exclusive UK marketing rights to Racal-Milgo by mutual agreement.

Case will continue to supply its existing customers.

### Open for business

TWO new operating companies set up by the bureau and software house Computer Management Group start trading this month. CMG Banking, operating from CMG City offices at Postgate, 63-73 Leazes Road, London E1 8EY, plans with £550,000 worth of business including software contracts from the US and the Middle East. CMG Northern starts with £100,000 worth of business operating from a new address at Sunley Building, Piccadilly Plaza, Manchester.

### Oil rig system

AN IBM Series 1 minicomputer has been installed by Shell to support consultancy and support system development. The system is a fully integrated management information system on tanks and is used by refineries and petrochemicals. It is a Series 1 section of 20 pages at the end of the year.

### ICL beats NCR

AUSTRALIAN minicomputer manufacturer Eastman McDonnell, who replaced its NCR minicomputer with ICL equipment, has won a contract to supply a system to a major oil company. Data is recorded on an IBM 360/50 and then sent to a minicomputer which controls the system.

# Appointments

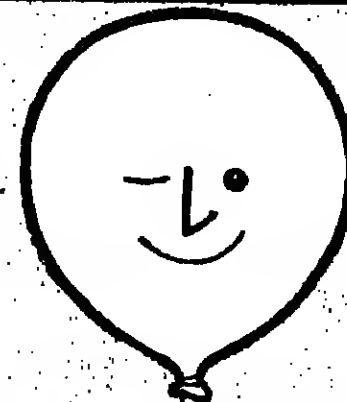
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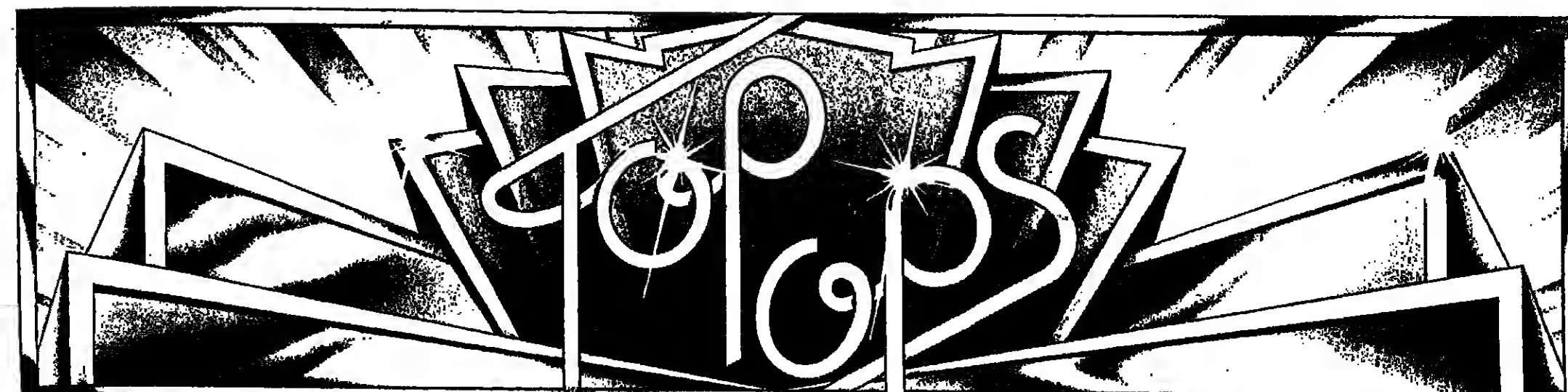
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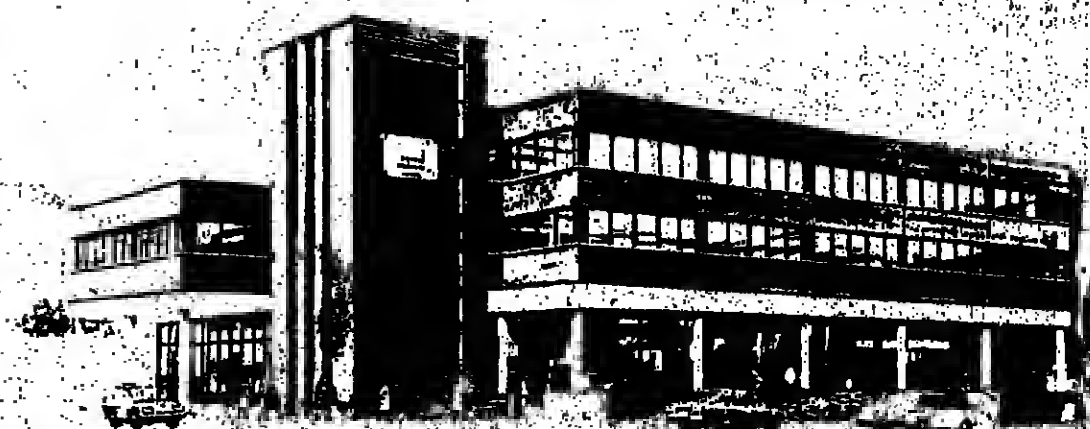
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H. Counties & Cheshire  
£6.5 - £9K

A prestige Client with Headquarters in London and regional offices located in Cheshire and throughout Europe urgently requires the following: Real-Time & On-Line Programmers & Systems Designers, Database & Compiler specialists with 2-5 years solid experience. Of particular interest would be people with relevant experience in one or more of the following: DEC with either BASIC, RTL II or CORAL, IBM or ICL with COBOL, Assembler or PL/I. Also Ferranti Argus or IMS or Database design specialties are welcome. The scope of projects is both broad and

demanding and certainly in keeping with the prestige of this client. You will play an important role in project development and will be given considerable autonomy in developing your technical expertise and enhancing your contribution to the work of this reputable group of which you will be more than proud to be a member. Matrix have been given a brief to pre-select suitable personnel and to recommend salary grades in line with our experience of prevailing market levels. We anticipate Salaries of between £6 and 9K being accepted. Ref. 1503/2

## Mini Software at Logica

Holland & Belgium  
£10,000 - £16,000 p.a.

Would you like to join the Dutch subsidiary of a world leader in Mini & Micro computer applications? The company itself is a British based international group with offices in five continents. They specialise in the supply of Bespoke turnkey systems based on Mini & Micro processors specifically in the Communications, Message Switching, Network, Process Control and basic software fields. Any assembler language is desirable. To meet their expansion goals they are creating numerous additional specialist

project teams requiring Consultants, Project & Team Leaders, Analysts and Programmers at various levels, specifically a) 5 years plus b) 2-5 years c) Trainees up to 2 years. If the idea of working at the sharp-end of sophisticated technical computer pioneering appeals and joining a very prestigious company is meaningful in your career development then you must give consideration to these opportunities. Ref. 1503/3

## PDP-11 Project Leaders Senior Programmers

C. London  
£6 - 9K

The foremost British Systems and Software Consultancy Group is seeking Senior project members in the areas of Data-Communications, Message Switching and basic software. A prerequisite is experience of PDP 11 based systems ideally using RSX11M. Analysts/Programmers will be skilled in the use of either Coral 66, Macro 11 or PASCAL. These appointments are for a new Real-Time Systems division and successful applicants will have the opportunity to establish themselves at a very senior level in a short time

span. The Group anticipate offering salaries well above prevailing market levels with the objective of attracting top expertise. In addition to an excellent salary you will be offered an excellent package of fringe benefits and the promise of an early review. Travel opportunities are available to those who enjoy visiting European business. A company car is available to some of the Senior appointees. Interviews will be held in London as soon as applications are received. Ref. 1503/4

## Database Designers & Analysts

Holland, Germany & London  
£6-8K (U.K.)  
£10-15K (E.E.C.)

An international client with offices in London and Europe is entering another major expansion phase for which they require additional Database expertise including Project Leaders, Systems Designers, Analysts and Senior Programmers. The latter should be skilled in either PL/I, COBOL, Assembler or Mark IV. Both Database and Data-Communications experience would be welcome. Applications are varied but include Banking systems, Airline booking and Stock control. Not less than two years relevant experience will be considered and for more

senior positions 4 years is the minimum. U.K. based personnel may have frequent opportunity to travel to Europe and the U.S. (if desired). Europe based personnel are given very generous expenses and frequent paid trips back to the U.K. Salaries need to say are going to be well above the norm in keeping with the client's prestige and the importance which they place on the acquisition of these key personnel. You will be interviewed either in London or flown out for the day to Amsterdam or Frankfurt. Ref. 1503/5

## Classifieds

Tel: 01-409 0468



360 Oxford Street,  
London. WIN 9HA.

BASIC PROGRAMMERS with either commercial or scientific backgrounds required by Important Central London based Client. Permanent or contract positions available at salaries of £6-8K or £235 p.w. up. Ref. 1503/6

COBOL or PL/I programmers are required contract or permanent by a City Institution. IBM OS is preferred but DOS considered. Two years min. experience essential. Salary: From £5 - 5.5K plus 2 1/2 % mortgage subsidy or £250 p.w. Ref. 1503/7

HARDWARE ENGINEERS (Minis) with a desire to work in the training division of a major Mini computer manufacturer. A pre-requisite is experience of 8 or 16 bit minis. Salary up to £8.5K. Ref. 1503/8

CITY — Programmers for Merchant Bank with 1900/2900 experience including COBOL, Driver &/or Maximp would be advantageous. Salary c. £5.5K + mortgage. Ref. 1503/9

BRUSSELS — T.P. and D.B. Applications and Software Programmers. Prof. IBM software. Full relocation expenses and vast range of real company benefits whilst salaries to £16K. Interviews at our London office. Ref. 1503/10

BERKSHIRE/HANTS BORDER — Micro specialists (Intel 8080, Zilog Z80) required by turnkey systems supplier. Established U.K. company can offer outstanding career positions. Salaries to £8K +. Ref. 1503/11

DENMARK + GERMANY — IBM IMS and/or Univac 1100 DBMS applications experience required for early 1979 start. Prefer permanent career person but consider contract. Ref. 1503/12

CICS Analyst Programmer. U.S. or DOS with either COBOL or Assembler experience. Central London based. Salary dependent on experience to £7,250. Financial systems background preferred but not essential. Ref. 1503/13

## CANADA

PRO-DATA SERVICES LTD. is a progressive software consultancy serving all facets of industry and government throughout Alberta. At present we are located in Edmonton and Calgary and due to the buoyant economy in Alberta, we have a requirement to expand our full-time staff level to maintain our leading position within the community.

We are interested in talking to **EXPERIENCED TECHNICIANS** who have a good track record in evaluating, designing and implementing computer systems in both the systems analyst and programmer roles. A minimum of 3 years' related experience is required.

If you have experience in any of the following areas it would be advantageous:  
★ Programming in COBOL, PL/I, or BASIC.  
★ Data Base Management Systems/T.P.  
★ Structured Design and Programming.  
★ Commercial applications knowledge.  
Interviews will be held in London, April-May, 1979.

If you are seriously considering a move to Canada, please apply in writing with details of qualifications and career to date to:

**Pro-Data Services Ltd.**  
c/o Alberta Manpower Mobility  
47 Upper Grosvenor Street  
LONDON, W1X 9PG

## HOWARD

BELGIUM £25,000 p.a.  
TELEPHONY SOFTWARE

We are looking for several software engineers with telephony background particularly in the call processing area. Systems Analysts. Applicants should have 3 to 5 years' experience in real time systems particularly in the field of data communications. Experience of Basic or Assembler languages coupled with top down structured design approach are essential (Ref. BJ270279b).

Programmer Analysts

To join a team to formally test the telephony software. Knowledge of assembler language coupled with a challenging and stimulating living term contract in a well known environment. From very loose spec. the need is to design software in PASCAL, code it in RTL/2 and integrate and test it. (Ref. BJ270279b).

## SWITCHING SOFTWARE PDP RSM11M PASCAL RTL2

Analyst Programmer

We are looking for an analyst/programmer to accept a very challenging and stimulating living term contract in a well known environment. From very loose spec. the need is to design software in PASCAL, code it in RTL/2 and integrate and test it. (Ref. BJ270279b).

Contact: **B. Jones 01-883 4088**  
Howard Organisation International Ltd.  
Employment Business Section  
8 Elstree Way, Borehamwood, Herts  
or Geoff King between 7 and 9 p.m. on Anytime 630808

## MARINE SIMULATIONS

Our client is a World leader in the development of shipboard control and surveillance systems.

One of the most expanding and stimulating areas is the development of control and surveillance systems based on DEC PDP 11. Software designers, with DEC and real time experience, are currently being recruited for these projects. The successful candidates will see this as an opportunity to further their careers.

Please quote Ref. 10A

**INTERLEX**  
MINI/MICRO RECRUITMENT

## Systems Development Manager

Turnkey Systems — Birmingham  
Top Salary + Car

We urgently seek to recruit a Systems Manager capable of developing modular package systems and controlling up to 50 Analysts and Programmers working to tight schedules. A sound applications knowledge is important, ensuring that the successful candidate will be capable of controlling feasibility study development and accurately forecasting developing times and costs. Knowledge of mini systems would be advantageous. Past programming experience at some point in your career will be a mandatory requirement. Experience of man-management is essential. Ability to prepare extensive tender documents and present software proposals at user board level will be important. This is a new opportunity in a small, fast growing Data Centre, offering a high flying Manager the chance of rapid progression based on the ability to get results. At a later date, profit sharing opportunities will be created for a successful Manager with good career development prospects. We must emphasise a sound applications knowledge as being essential, along with the ability to control and direct a technical/software development section. Systems tenders vary from £15,000 to £300,000 each. No candidates under 30 years of age will be considered. Relocation assistance will be given where appropriate. Salaries will be negotiable. No one earning under £7,000 is likely to have the necessary experience to handle the complexity and pressures of this managerial role. Apply initially to the Managing Director's Secretary for application forms. Telephone 0782-623865 and ask for Sandra.

For application  
form see page 37



EMS Consultants Ltd.  
81-83 Lower Street  
Newcastle-under-Lyme  
Staffs ST6 2RS  
Telephone 0782 623865  
(10 lines)  
Register NOW!

## THE COMMISSION OF THE EUROPEAN COMMUNITIES

Joint Research Centre - Ispra Establishment (Italy)  
is seeking  
for the Information Analysis and Data Handling Division

## A SCIENTIST

(Ref. 571/78)

with university degree or diploma in COMPUTER SCIENCES, with particular emphasis on DATA BASE MANAGEMENT and INFORMATION SCIENCE.

He will collaborate, within the SCIENTIFIC DATA MANAGEMENT SECTOR, in the methodological and information support to the Joint Research Centre's data bank projects. His function will include:  
• direct participation in the design, implementation and maintenance of data banks and associated services  
• identification of general problem areas which give origin to autonomous development and/or research  
• participation in the R & D projects of the sector in the field of information science (automatic document processing, high-level data base interrogation languages, distributed data bases, etc.).

An experience with ADABAS would be advantageous. A thorough knowledge of one Community language and a satisfactory knowledge of one other Community language, preferably English, are also required.

## A PROGRAMMER

(Ref. 0/79)

with advanced technical secondary education and certificate in COMPUTER PROGRAMMING.

He will:  
• participate in the R & D projects which concern automatic documentation and data base interrogation languages  
• give technical support to the data bank projects of the Establishment, which include: design and set-up of data bases, design and implementation of programs and procedures for loading and maintenance of the data bases and of the interfaces with users application  
• participate in the activities of the "Data Base Administrator".

A thorough knowledge of COBOL, FORTRAN and ASSEMBLER languages, and of analysis, program design and techniques, are essential. Experience of non-numerical data processing in data base environment is also required, as well as a thorough knowledge of one Community language and a satisfactory knowledge of one other Community language, preferably English.

Recruitment criteria, based on the staff regulations and salary scale applicable to temporary agents of the European Communities: Temporary contract, up to five years, with possibility of renewal. Salary according to age, qualifications and experience. Other benefits include family and expatriation allowances. Only nationals of the Community Member States may be considered for the above posts.

Regulations, WHICH MUST CLEARLY SPECIFY THE REFERENCE OF THE POST APPLIED FOR, should be sent to the following address, together with a detailed curriculum vitae and copy of degree or diploma:  
JOINT RESEARCH CENTRE, Administration and Personnel Division, I-21020 ISPR (VA), Italy  
WITHIN TWO WEEKS OF PUBLICATION.

The candidates are requested to apply separately for each post they may intend to compete for.

## Top Turnkey Salesman

Numerous UK Positions

10-15K Packages + Car

E.M.S. urgently requires experienced computer salesman to help with a deluge of mini computer turnkey enquiries. We currently market 2 major products, these being the Honeywell Laval 6 and the Data General series. We cover the whole of the industrial and commercial sectors, necessitating salesmen to have sound marketing experience and being able to present a formal business image in a multi-user environment. Ideally, sales staff will already have a year's mini marketing experience, although a top mainframe salesman now starting to feel the pressures of the mini onslaught on the old, traditional base would equally find that his/her experience would enable him/her to attain vast turnover rapidly with E.M.S. product prices and outstanding applications software support. We are looking for mini salesmen who already have attained sales in excess of £200,000. These people will achieve over £500,000 with E.M.S. leads and support. Mainframe salesmen equally can easily double figures marketing entire networks on behalf of E.M.S. Mature sales presenters capable of achieving top earnings, with no cut-offs are urgently sought by the company to capitalise on the many opportunities already available. Excellent brochures and back-up facilities are available. Good earnings packages and top prospects are available throughout the U.K. Apply now for early interviews. Consultant: John Wood (0782 623865).

For application  
form see page 37



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81-83 Lower Street  
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Staffs ST6 2RS  
Telephone 0782 623865  
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## IF YOU TALK OUR LANGUAGE LET'S TALK BUSINESS

CONVERT TO BYTES TO REMOVE AT EXIT  
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IF CC ILLEGAL DISC CODE  
IF MY CODE = 63  
MAP TO DIRECTIVE DISPATCH TABLE  
IF TO ILLEGAL DIRECTIVE  
POINT TO PROPER TABLE ENTRY  
DEB SIZE MATCH  
IF NO  
GET ADDRESS OR DIRECTIVE ROUTINE  
POINT UP DIRECTIVE SIZE AND MARK BYTE

## SENIOR SOFTWARE ENGINEERS to £8000 plus

Systime is a major British manufacturer of mini-computer based business systems, with a remarkable track record. It's consistent success ensures a highly stimulating working environment and significant opportunities for staff to extend their experience and income.

The company's development plans require the appointment of **SENIOR SOFTWARE ENGINEERS**.

A minimum of three years relevant experience is required, preferably including a period of working in assembler code.

At system level. Successful applicants will work in an expanding department and will be responsible for major software developments. These projects will include developments related to operating systems and tele-processing monitors for PDP 11's & VAX 11's. Pension and bonus scheme with a company car in some cases. Relocation assistance is available. Write or telephone to: Personnel Manager, Systime, Concorde Computer Centre, 232 Devesbury Road, Leeds LS11 7DF. Tel: 0532 70741.

**SYSTIME**

Applicants are invited for the following posts working with the recently installed ICL 2570 computer at the Authority's Computer Services Department based in Bradford. The posts will involve working variable alternating shifts of 0730 hrs-1930 hrs Monday to Thursday, 0730 hrs-1500 hrs Friday, and 1430 hrs-2230 hrs Monday to Thursday, 1400 hrs-2200 hrs Friday for which an allowance of £1250 p.w. will be paid.

## ASSISTANT SHIFT LEADER

£8,101-£9,967 p.a. inc. shift allowance — Ref. 1503/274

Applicants should have several years' experience of large-scale computer operation including supervisory responsibility. They will be required to attend at the Shift Leaders during that absence, and also provide cover at installations in the Authority's Divisions as required.

Application forms are available from the Regional Personnel Officer, Yorkshire Water Authority, West Riding House, 87 Albion Street, Leeds LS1 2AA (Tel. Leeds 468251) 9.00-5.00 p.m. where they should be returned by post latest 10 March 1979, quoting the appropriate reference number.

**Yorkshire Water**

## FREELANCERS

Major Consultancy working through the UK and abroad require

## MEN OR WOMEN ANALYSTS/PROGRAMMERS

with initiative to work on small business and scientific systems mainly in the Midlands. Experience with mini-computers and production systems programmed in BASIC would be an advantage.

Please write with an outline of career to date stating degree of competence in languages and machines used. Please also indicate availability.

Box 1016 COMPUTER WEEKLY

## D.P. MANAGER

£7.5K plus bonus

Expand a department that uses a Burroughs 6800. The company has international connections and is looking for an ambitious applicant with programming and systems experience in an accounting environment on a similar machine.

For early interview telephone 01-405 0854, now quoting Ref. 1503/275. ORANGE BENSON APPOINTMENT CONSULTANTS, 121 Kingsway, London WC2.

**Drake Senior**  
Appointments





## KUWAIT 25K PACKAGES

Our clients, Inter-Consult, Kuwait's largest Consultancy, has a large range of additional vacancies to cope with ever-increasing client demands. They need a wide range of experienced IBM and CMC staff. IBM Senior Analysts/Programmers with CICS ASSEMBLER capable of advising on the development of the Banking Systems are urgently required. Experience of IMS or DL/1 would be advantageous. Additional requirements include Analysts, Programmers and Analyst/Programmers to work in Banks, Ministries and Oil Companies, including major trading groups. Staff with CMC programming experience are urgently sought to assist with Turnkey Systems support in Kuwait.

Consultant: Don Philip (021-454-7906).

## SYSTEMS ANALYSTS/NORTH WEST

E.M.S. urgently needs to recruit a large number of 2 years plus experienced Analysts to work on a wide variety of commercial systems. Opportunities exist for involvement on real time, database and networking systems, as well as general commercial and merchandising systems. Working for a consultancy involves a variety of site assignments with later involvement supporting Turnkey Systems teams working in your home area. We offer excellent career development prospects with adequate opportunity to either specialise in local region support tasks, or the choice of national and international travel if required. Analysts should have at least 2 years' systems experience in a commercial or industrial environment. Relocation expenses will be paid where appropriate. Candidates should be aged 23 upwards and preferably hold a current driving licence.

Consultant: Don Philip (021-454-7906).

## PROJECT MANAGERS C£6,500

Applications are invited from experienced Project Leaders and Managers interested in joining a rapidly expanding Turnkey group based near Central Birmingham on the Fiveways roundabout. We need professional, competent team Managers, capable of planning, scheduling and implementing modularised application systems, configured on mini and micro processors, to an agreed time scale. Ability to design and control the development and final testing of complete systems will be important, as will an adequate programming knowledge for quality checking the work of other team members. Ability to undertake feasibility studies and accurately assess and cost systems and programming requirements to fulfil total client requirements will be an important part of your managerial duties. A wide range of clients are available, covering all sectors of industry and commerce. Car owners will be preferential for this level of appointment as client visits and presentations will be involved. We seek mature, constructive thinkers capable of designing effective application systems and motivating teams assigned to them.

Consultant: Don Philip (021-454-7906).



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# COBOL PROGRAMMERS

## European Assignments

### 2900 VME/B

PROGRAMMERS and SENIOR PROGRAMMERS ..... to £13,000

SENIOR PROGRAMMERS with IDMS and TP EXPERIENCE ..... to £17,000

INTERESTING PROJECTS  
DATABASE/DEVELOPMENT  
HIGH REWARDS (£££)  
TRAINING OPPORTUNITIES

Programmers with 2 or more years' COBOL experience are required to work on challenging and interesting projects as part of Marcol's European team who are achieving substantial successes on the Continent. Preference will be given to those applicants who have VME/B or VME/K experience, however ICL 1900 and 2903/4 programmers who are willing to undertake a 3 to 6 month training program in the U.K. should also apply. Unlimited career prospects are possible at:

# MARCOL

For full details and a confidential interview please ring or write:  
Derek Ashley or Penny Bailey

Total capability from the  
60 Queens Gardens, London W2 3AF. Tel. 01-402 6356/24 hours

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JBA

## SOFTWARE AND COMMUNICATIONS SPECIALISTS

Berkshire

up to £10,000

We have been retained by an international organisation who are recognised as a leading company in the development of computing, both in the software, hardware and applications field. Many of their projects span a whole range of sophisticated techniques from micro-processors through communications, middleware, database to operating systems.

There are currently several vacancies at Programmer, Designer and Project Leader levels within the Software and Communications groups for staff with a desire to work in a professional environment on new development projects.

### SOFTWARE SPECIALISTS

Applicants for this group must have at least three years experience working on one of the established operating systems such as EXEC 8, OS/DOS or VME-R/K either in a development, maintenance or enhancement role. One or two positions are available for people with a background of T/P, networks or other similar types of software.

### COMMUNICATIONS SPECIALISTS

Candidates should have at least five years experience in the d.p. industry with the early part spent in applications development and the latter two or three years in the design of communication and network systems. A background of message switching or work on significant networks would be ideal.

If you would like to discuss these opportunities further please contact JIM BAKER.

JAMES BAKER ASSOCIATES  
International Personnel Consultants  
16 Maddox Street, London W1  
Tel: 01-491 4478

## MYRIAD

IBM SYSTEM 38 IN GUILDFORD

### SENIOR PROGRAMMER ANALYST/PROGRAMMER

TO £7000 + BONUS

Applicants for these positions will have gained a strong knowledge of RPG II (3 years +) on IBM equipment and have a good understanding of CCP. A background in commercial systems will be an advantage but full training will be given in O & M, D.P. and business procedures. The data processing department is engaged on a variety of development projects (most of which use on-line techniques) and has expansion plans that continue well into the next decade. A System 38 is on order to replace the System 3 currently installed, so persons joining the company can now be assured of an interesting and rewarding future.

In addition to a pension scheme, four weeks' holiday, BUPA and L.V.s, employee benefits include a generous annual bonus. The offices are easily accessible by road or rail from most parts of Surrey and relocation expenses are paid where applicable.

MYRIAD APPOINTMENTS LIMITED (Computer Personnel Consultants)  
Telephone or write to:- 30 Fleet Street, London EC4A 3AA 01-353 0981 (24 hrs)

### CLASSIFIED COPY

All classified copy should reach our offices no later than 5.30 p.m. on the Monday preceding Thursday's publication. If complete artwork is supplied 12 noon on a Tuesday.

Ring David Abbey for further details on 01-261 8016

PROGRAMMERS, OPERATORS, ANALYSTS  
WISH YOU WERE HERE!  
Sincerely, PAMELA

VP 01-491 5254

### OPPORTUNITIES AT REMPLY

Remply is a multi-industry organisation with 87 factories nationwide. We have four vacancies at our Head Office in North West London; the successful applicants for these four posts will be working on further developments to the Company's on-line system on I.C.L. 1901T. They will also be working on micro-computer systems to be installed to handle business systems within our factories.

#### SENIOR SYSTEMS ANALYST

Salary range £5000 p.a. - £6500 p.a.

Applicants must have at least 4 years' computer experience, and must have taken at least one system from design stage to implementation. I.C.L. experience is desirable.

#### CHIEF PROGRAMMER

Salary range £5000 p.a. - £5500 p.a.

Applicants must have at least 4 years' programming experience, and should be able to control junior staff. I.C.L. 1900 experience is essential, preferably including "Direct".

#### ANALYST/PROGRAMMERS

Salary range £3500 p.a. - £5000 p.a. and £3500 p.a. - £5500 p.a.

Applicants must have at least 2 years' programming experience in "Cobol". I.C.L. experience is desirable.

We offer the usual benefits (as negotiated) with a large company including generous holidays, pension and life insurance and subsidised restaurant.

Please write to Recruitment Manager, Remply Ltd, 415 Edgware Road, London NW2 6LP, or telephone 01-492 8020 ext. 311.

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## MYRIAD

## COULD YOU BE A RECRUITMENT CONSULTANT?

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£27500-£120000

If you are interested in recruitment but do not have the necessary experience Myriad may be able to give you the opportunity to train as a Recruitment Consultant.

As one of the major companies in our field with a well established professional reputation, we have both the resources and expertise to train you in the skills needed to carry out this challenging and rewarding work.

You must have a background in the computer industry, such as programming, analysis or any sales orientated position. Without this essential grounding you could not be expected to give career advice to applicants or advise clients in major recruitment assignments. Under 35 you should possess the potential to succeed in highly sales orientated situations in which you will have the freedom to work very much on your own initiative.

The wide range of activities encompassed by the work will undoubtedly surprise you. You will also be interested in your training and career development. To find out the answers and much more about the varied and interesting life as a recruitment consultant, contact us to arrange an informal discussion and we will also tell you about the outstanding long term career opportunities available.

Ref: AW2/0803

MYRIAD APPOINTMENTS LIMITED Computer Personnel Consultants  
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**SMR** Sales & Marketing Recruiters Ltd  
Victory House, 99 Regent Street, London W1R 7HB

## U.K. MARKETING MANAGER DESK TOP SCIENTIFIC AND TECHNICAL COMPUTERS LONDON BASED

This is a unique opportunity to join one of the world's top marketing organisations. Our client is seeking a person to lead a young enthusiastic team of sales development executives at their Head Office. This group provide product management, sales development and sales support.

Candidates must demonstrate the ability to manage this group as well as to create and communicate ideas both to the field force and senior management. The team is responsible for the analysis of the market, the application areas, the competition and pricing policy. They develop software, promotional material, sales campaigns and liaise with advertising and training departments.

They also fulfill the traditional product management role of providing feedback to the R & D group to influence future product design and marketing concepts.

Ideally you should have:-

1. Two years successful selling and if possible sales management experience in this market area.
2. Marketing experience preferably in this area.
3. Knowledge of the scientific and technical application areas.

Preferred age 25 - 40.

Travel within the UK is involved plus occasional trips abroad.

**Total Remuneration c £10,000pa**

Plus generous car allowance, BUPA and the fringe benefits of a large company.

This opportunity is open to both men and women.

Please apply quoting reference no. SD039, to Bernard Conn or Elizabeth Attwell.

Tel: 01-734 9776

A Sales and Marketing Services Company  
TRAINING, PROMOTION, RESEARCH, RECRUITMENT

UNIVERSITY OF MANCHESTER REGIONAL  
COMPUTER CENTRE

Director: Professor Gordon Slack

Applications are invited for the following vacancies:

## PROGRAMMER

The successful candidate will work as a team responsible for the maintenance and implementation of different computer systems. Applicants should be educated to degree standard and have experience of computer and systems programming together with a knowledge of FORTRAN and one other high level language. A knowledge of COBOL and/or ICL 1900 systems would be an advantage.  
Salary: £3,384-£5,604 p.a. or £3,883-£6,655 p.a. dependent upon qualifications and experience. USS Ref: 45/79/CW.

ASSISTANT  
COMPUTER OFFICER

This post will be in the liaison and training section which is responsible for maintaining direct links with representatives in some 50 schools and departments. The work involves advising and helping users with a wide range of backgrounds and experience. An effective communicator, interested in dealing with people and with a knowledge of one or more high level languages is required.  
Salary: £3,384-£5,604 p.a. USS Ref: 45/79/CW.

Further details and application forms (returnable by March 26, 1979) are obtainable from the Registrar, The University, Manchester, M13 9PL, quoting the appropriate reference.

## WILTSHIRE

## ANALYST/PROGRAMMER up to £6,000

Our clients, Linton and Thurst Ltd., an expanding international group of companies using advanced computer systems, wish to recruit an Analyst/Programmer. Their current hardware configuration, a Burroughs 5700, is being replaced by three ICL 2903/4s, and in line with the growing environment, ICL's financial production packages LUCRE and QMAC are implemented in conjunction with existing systems.

The suitable applicant, male or female, will have at least three years' total programming experience, and will be able to show a reasonable level of system involvement. A knowledge of ICL software and hardware is essential and previous involvement with LUCRE and QMAC would be an advantage.

## TRAINEE PROGRAMMER - Salary Neg.

To assist in the implementation of the systems development currently in progress, the suitable applicant will have a minimum of 3 months' practical Cobol experience. Alternatively this position may appeal to a person who has just completed a training scheme, e.g. a TOPS course, and is ready to start a career in computing.

Situated close to Swindon, with easy access to the M4, the company offers a career opportunity and prospects. Benefits include paid overtime, pension scheme and assistance with relocation expenses where appropriate.

Applications for this position will only be considered through Sanders. Executive. Please phone or write in the first instance to Chris Wilson, 64 Fenton, Victoria Street, Clifton, Bristol.

**Sanders** 64 Princess Victoria Street  
Clifton Bristol  
EXECUTIVE RECRUITMENT  
TELEPHONE 0272 39302

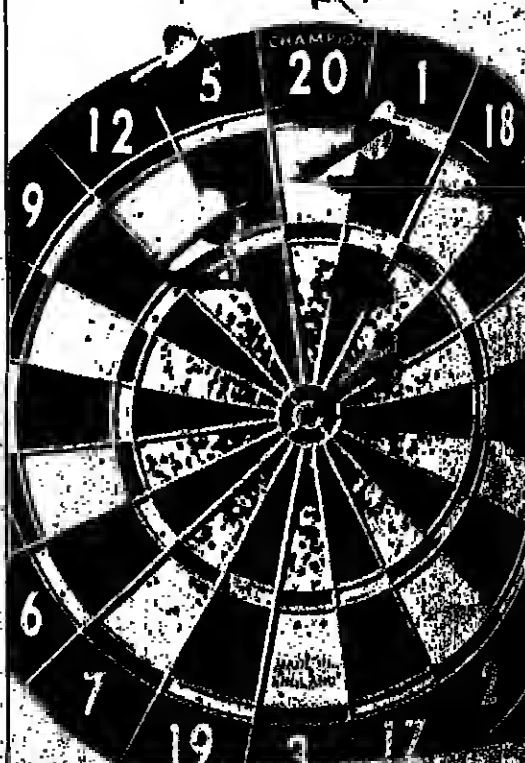
## BULLSEYE!

## Infotron Systems are looking for winners

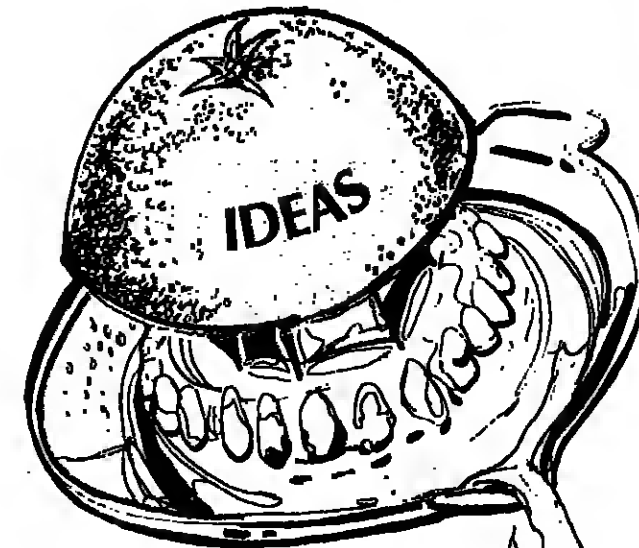
Infotron Systems Limited is a rapidly expanding young company in the field of Data Communications, specialising in microprocessor based Time Division Multiplexers. We are looking for Sales Personnel to help us with our growing market throughout Western Europe and wish to recruit Regional Sales Managers, Sales Engineers and Technical Support Engineers. Salary levels are high with commission payments where appropriate. We can promise an interesting and exciting job in a team whose contacts and friends extend across the world.

Telephone or write and let us arrange an informal interview in London or Dunelm.

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Dorchester (0308) 88018



# Software Programmers needed to extract the most from our orange boxes



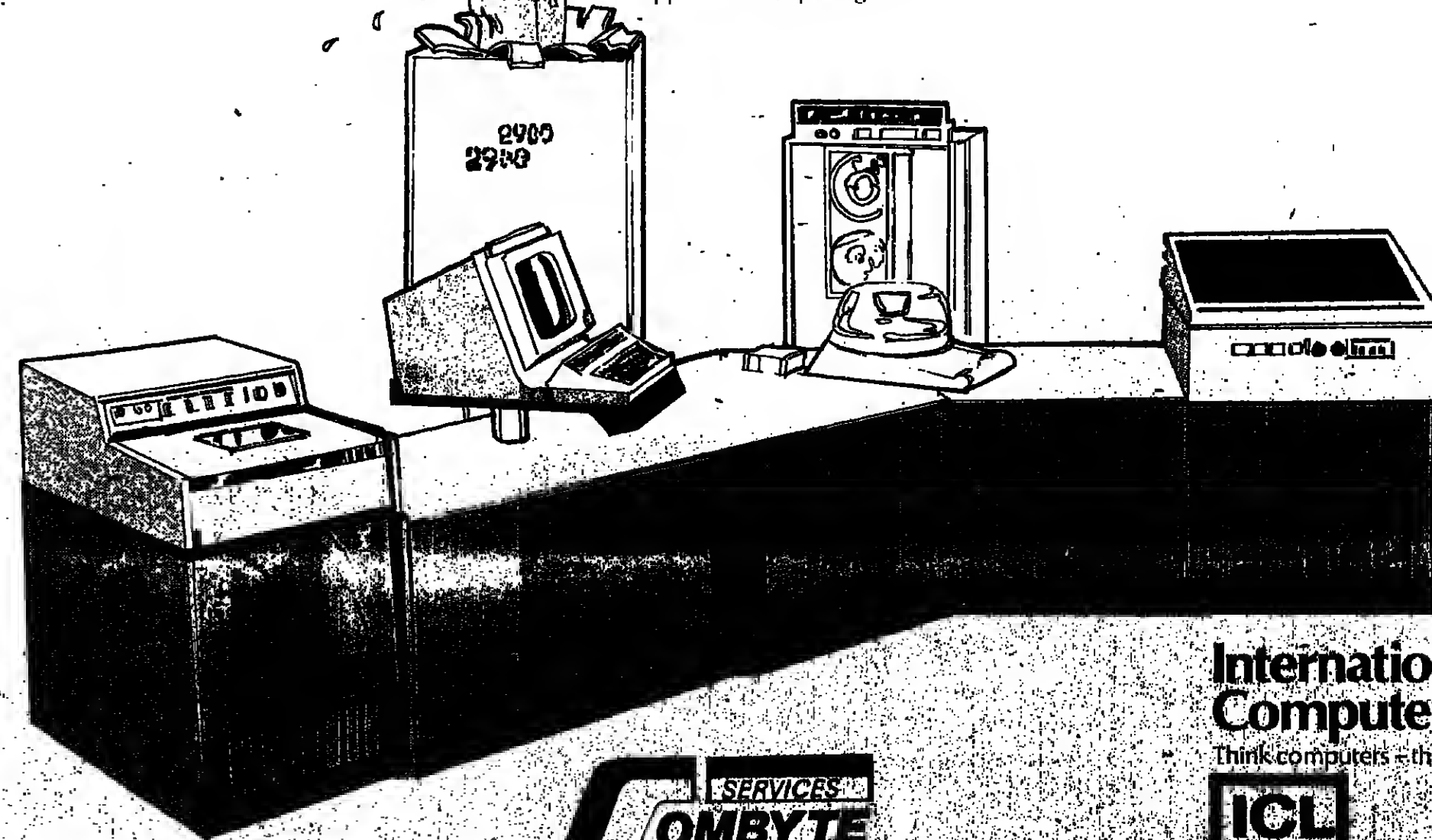
ICL has made a number of major announcements for DME and 2903 style products in the last year. Because of the striking success of these products, we are expanding the development unit involved and need a further 10 programmers immediately.

## Systems Programmers & Microcoders (Bracknell)

These positions will suit programmers already involved in Operating System Development, who wish to expand their experience of System Software. However applications programmers with 2 years + experience of Assembler level languages, will find this an ideal opportunity to branch into Systems Software. When you join us you will work in small highly motivated teams developing the DME system for the 2900 series using sophisticated Software Engineering tools.

For IMMEDIATE INTERVIEWS and further details of these exciting opportunities along with other benefits, including a special education package and participation in the 1978-79 Self Financing Productivity Scheme on top of a starting salary of £4,5k to £7,5k.

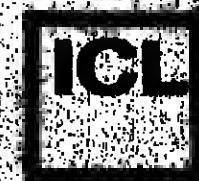
Contact MARILYN DAVIDSON the Consultant advising us on these appointments, quoting ref. CW1.



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## THE COMMISSION OF THE EUROPEAN COMMUNITIES

Joint Research Centre - Ispra Establishment (Italy)  
is seeking for the Informatics Division:

### A SCIENTIST

(REF. 580/78) with university degree or diploma in **COMPUTER SCIENCES**.

To be charged, within the **SYSTEMS AND BASIC SOFTWARE SECTOR**, with evaluation tests on software, especially on **TELEPROCESSING** software. His tasks will include:

- 1) design and development of programs and/or test inputs which serve to guarantee that: ☐ products, when in operation, respond to the specifications; ☐ possible interfaces with other software elements are perfectly respected; ☐ efficiency of software is at least equal to expectations;
- 2) responsibility for the liaison with, and verification of the documentation to be transferred to, the "Informatics Support Sector";
- 3) any other requested work in the field of software development.

A thorough theoretical and practical knowledge of **PROGRAMMING TECHNIQUES** is essential - The function implies an ability to establish efficient contacts with colleagues.

A very good knowledge of English and a satisfactory knowledge of French or Italian are also required.

### A SCIENTIST

(REF. 520/78) with university degree or diploma in **ELECTRONICS** or **COMPUTER SCIENCES**.

He will be **RESPONSIBLE** for the **COMPUTER SECTOR** and will report directly to the Head of the Informatics Division.

His tasks: ☐ studies related to the choice of hardware; ☐ technical contacts with the suppliers; ☐ organization of the facilities, daily management and running of the hardware of the computing centre and of the teleprocessing network.

A thorough knowledge in the field of **COMPUTER HARDWARE** and experience in conducting an **IMPORTANT TEAM** are essential.

A very good knowledge of English and a satisfactory knowledge of French or Italian are also required.

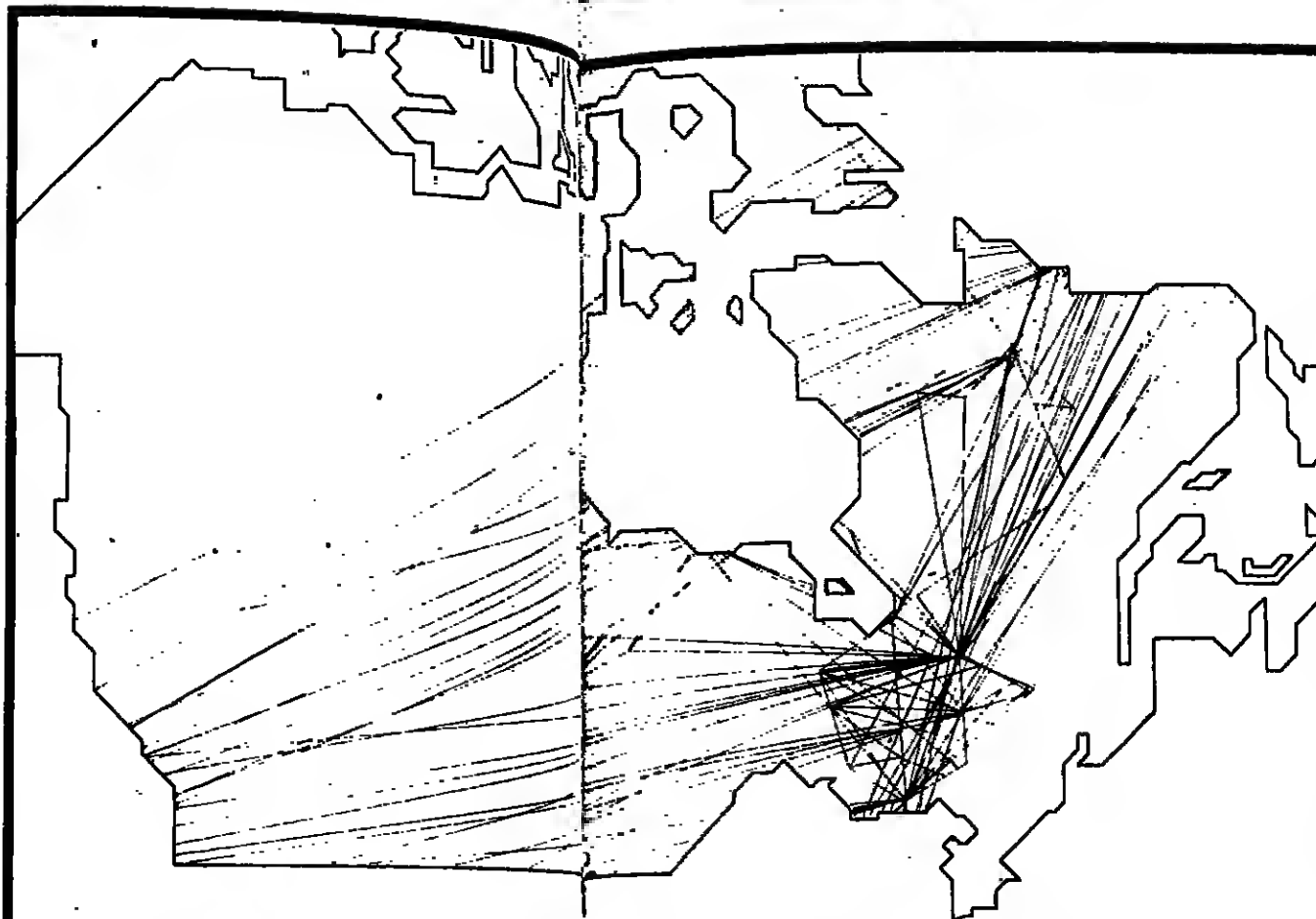
**Recruitment criteria, based on the staff regulations and salary scale applicable to temporary agents of the European Communities:**

Temporary contract, up to five years, with possibility of renewal - Salary according to age, qualifications and experience. Other benefits include family and expatriation allowances.

Only nationals of the Community Member States may be considered for the above posts.

Replies, **WHICH MUST CLEARLY SPECIFY THE REFERENCE OF THE POST APPLIED FOR**, should be sent to the following address, together with a detailed curriculum vitae and copy of degree or diploma:  
**JOINT RESEARCH CENTRE, Administration and Personnel Division, I-21020 ISPR (VA), Italy**  
**WITHIN TWO WEEKS OF PUBLICATION.**

The candidate are requested to apply separately for each post they may intend to compete for.



### Canada

Canadians can justify that Canada is still the land of opportunity - a land where the individual's effort and merit is to be rewarded, where to be encouraged and where high technology is seen to be a tool by which the lives of the community as a whole can be enriched. It is a country which offers a wide variety of life and social activities and room to breathe.

### Bell-Northern Research

known more commonly as BNR, is one of the foremost telecommunications research organizations - a Canadian Corporation jointly by Northern Telecom Limited and Bell Canada, which was initially conceived to meet needs for an indigenous source of telecommunications design for Northern Telecom. It is important to note that neither BNR nor its parent companies are related in any way to American Bell system of companies.

Now we have an enviable international reputation and many contractual agreements with independent telephone companies, government agencies and firms in related fields; and we have major resource centres located in Ottawa, Montreal, Toronto and Palo Alto, California to meet these demands.

Our success and our continued ability to respond to an ever-changing environment across the thresholds of new technology means we can offer outstanding opportunities to professional, ambitious men and women who wish to progress their careers and be involved in projects from inception to completion.

### Systems Design & Research

Emerging technology is making possible new communications concepts and markets. However, new technology by itself is not enough. Existing communications systems, economic, social factors, and human factors must be considered. In Bell-Northern Research, the systems divisions has the responsibility to carry out the research and analysis required to relate these factors in planning telecommunications systems of the future.

Our systems people are market researchers, engineers, computer scientists, mathematicians and operations research analysts, economists and others with a multidisciplinary outlook. These teams of specialists ensure that the technology developed is effectively integrated into systems that meet end-user needs and fulfill future market requirements.

Continued growth and promotional moves have created numerous opportunities for oriented people within our various systems groups.

### Digital Switching Systems

are key elements in our rapidly evolving totally integrated digital telecommunications network. Key individuals with experience in, and a broad knowledge of communications are needed to work in the areas of central office, PBX, new business services and systems interface planning.

Opportunities in this department are:

- carry out systems planning studies for the introduction of both large and small digital switching systems
- plan the configuration of digital switching machines to provide both current and future business services switching features
- identify the switching capability requirements for future telecommunications network offering and evaluate them in relation to evolving switching technology
- assess switching architecture alternatives and basic restraints in the light of technological trends with the objective of optimising future generations of switching systems.

### Operations Systems

have been transformed by computer technology. The introduction of processing and computing capability in the telephone network is providing opportunities for implementing new services and for changing the operation of the network.

Opportunities in this department are:

- definition and introduction of common channel signalling
- automation of operator functions
- introduction of systems to modernise the network control, management and data collection function.

### Maintenance Systems

include alarm, test and remote surveillance systems and incorporate the latest computer technologies and state-of-the-art test techniques.

Opportunities in this department are:

- define maintenance features for all new product offerings
- study and define improved means for maintaining digital switching systems and trunk and subscriber facilities.

Appropriate experience for the above areas should be augmented by a knowledge of communications systems or skills acquired in some of the following areas:

- product development processes (H/W and S/W)
- digital transmission/switching systems and technologies
- data communications
- engineering economics
- local/toll network planning
- mini and micro-processor technologies (H/W and S/W)
- measurement and signal processing techniques

## SYSTEMS PROFESSIONALS-

Broad innovators with imagination...  
to look beyond existing technology to identify  
communication products for tomorrow.

### Fibre Optic and Digital Transmission Systems

Planning has begun for introduction of fibre optic systems. A team of systems, technology and development specialists is presently being assembled to initiate the introduction of state-of-the-art fibre optic systems in the trunking and distribution network.

Opportunities in this department are:

- plan the large scale implementation of fibre optic systems for transmission and delivery of existing and future narrow band and broadband services
- integrate technological advances into digital subscriber carrier systems.

Individuals should have a good knowledge of communication systems or skills acquired in some of the following areas:

- communication networks
- current and future technologies (especially LSI, fibre optics, microprocessors, video, software)
- existing and possible future communication service offerings (broadband and narrow band)
- system design and optimisation
- digital channel banks.

### Network Planning & Standards

The flood of new services made possible by digital switching and transmission systems is having a profound impact on the telecommunication network. Subscriber loop systems, future architectures and transitional strategies for evolution of local telephone network are key areas of research.

Opportunities in this department are:

- develop complex computer programs for use as planning tools in network architecture studies and to use them in planning the introduction of new services, technologies (e.g. digital, satellite) and methods (e.g. routing, dimensioning)
- carry out switching system simulations in order to determine traffic capacities and to develop possible design improvements
- investigate and exploit opportunities offered by new technologies that make possible the attachment of many new devices to the telephone network and ensure that the integrity of the existing network is preserved
- develop standards for future communication systems.

Individuals should have related experience, a good knowledge of communication systems and possible exposure to:

- subjective evaluation (human perception) of telephone connections
- engineering economics
- transmission performance
- familiarity with future possible telecommunication services
- electrical interference and protection of telecommunication networks.

### Information Services Planning

A vast array of future home and business services are becoming possible with all digital voice and data telecommunications and our planning for the introduction of services is now at a critical stage.

Opportunities in this department are:

- planning, definition and prototyping of information based services for home and office
- market definition
- planning for packet switched and circuit switched data networks to support future home and business services.

Applicable skills or experience are needed in the following areas:

- minicomputer and microprocessor technology (H/W and S/W)
- interactive remote computer applications
- electronic mail and messaging systems
- data communications network topology and access systems
- computer communications - network protocols.

### Research

Research is on-going in combining advances in electronics, communications sciences, and computer sciences. Some key areas include: visual communication systems, human speech perception (both physical and psychological), speech encoding, network design, and distributed processing.

Individuals require appropriate experience in the respective work areas with emphasis on some of the following:

- real time computer software
- computer graphics
- computer communications
- data base management
- microprocessor technology
- digital signal processing
- speech acoustics
- linguistics
- market trend research.

All candidates must have at least a Bachelor Degree from a recognised university as well as several years' related experience. Preference will be given to self-motivated individuals who can really communicate communications, not only internally, but on a client liaison basis. Not only do we offer a stimulating work environment in one of the most progressive countries in the world, but a corporate compensation plan in which creativity and innovation are fully rewarded. An extensive company-paid benefit package including contributions to public hospital and medical programmes as well as a share purchase plan is also provided.

Interview expenses to London and relocation assistance to Canada will be provided.

**If a career in Canada with Bell-Northern interests you, please send a detailed resume including business and home telephone numbers and complete mailing address, no later than 6th April 1979 to:**

**Mrs. A. Weckwerth, Manager Staffing, Bell-Northern Research Ltd., c/o Dept. 994, Government of Ontario, Ontario House, 13 Charles II Street, London SW1Y 4QS.**

**Interviews with Senior Company Representatives will be held in London during week commencing May 14th.**

As these opportunities will also affect your family's lifestyle, your spouse is invited to attend an informal presentation on the day of the interviews, subject, of course, to selection. Detailed information on Bell-Northern Research, Canadian lifestyles, housing, education and recreational facilities will be provided at that time.

**Bell-Northern Research.**  
Telecommunications opportunities in Canada



## DP Consultant (Minicomputer Specialist) Bushey £7000+

Rank Xerox are currently developing large scale minicomputer based decentralised applications systems for use throughout Europe. These systems will interface with new and existing applications systems on our IBM 370/158 in U.K., France and Germany and will communicate over the Rank Xerox Data Network which is being extended to support a growing demand.

The Minicomputer Specialist will be a member of a team of internal consultants based at Bushey, near Walford, and will have responsibility for advising project teams on the advantages/disadvantages of decentralisation, identifying and evaluating alternative hardware/software options and making specific recommendations to management. He/she will also interface with the Rank Xerox Data Network Group and the IBM Mainframe Technical Support Group and provide support to project teams during the development and implementation phases of their applications systems.

Applicants should have an extensive (minimum 5 years) broad based technical data processing background which includes experience of IBM operating system software in addition to experience with minicomputers.

Salary is as indicated and an excellent benefits package includes 4 weeks holiday, rising to 5, generous pension, life assurance and sickness benefit schemes, subsidised staff restaurant, active sports and social club, and, where appropriate, relocation expenses.

For more information on this particularly interesting career opportunity, contact Jack Kennally at Rank Xerox Limited, Phoenix House High Street, Bushey, Herts. Tel: 01-950 4090.

**RANK XEROX**

### COMPUTER SCIENCE GRADUATES

Up to £8,085

International computer company requires Technical Systems Analysts, to join small team responsible for Operating-Systems-Software in a large computer complex based in Central Scotland

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YOU DO NOT NEED TO SPEAK



**Computer Data  
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Limited**

### EXPERIENCED OPERATORS and CONTROL CLERKS

Salary - £4,400 (with review in June)

Once again our expansion plans - which include the installation of an ICL 2872 in this summer - require us to recruit experienced operators and control clerks. Our present configuration consists of an ICL 2880 plus 2 x 4/72s.

If you would like the opportunity to work with one of the most efficient Operations Teams in the country, please get in touch with us - we pay our staff well but we demand the best so please do not bother to apply unless you are prepared to work hard.

Three shift working is in operation and we offer four weeks' holiday after one year's service in addition to a 32½-hour week (if you could see the operators stagger out of the computer room at the end of their shifts you would understand why we have such a short working week!). If you are good at your job and would like a fresh challenge then why not write to, or telephone,

Alan Martin  
Operations Manager  
**COMPUTER DATA  
PROCESSING LTD.**  
Oakfield House,  
Pennyway Road,  
Haywards Heath, Sussex  
Tel: Haywards Heath 58188

ipc



Is required with proven sales ability who can demonstrate self-motivation in a dynamic front-line sales environment. This post which carries excellent commission demands a high degree of initiative and the ability to relate to a customer's technical requirement in the field of Data Communications.

Who are interested in utilising their engineering experience and knowledge of Data Communications by working on advanced Integrated Digital Networking Systems are also required. In addition to their Communications experience in Hardware or Software they must be able to demonstrate a flexible approach to technical solutions in a consultancy atmosphere.

SOUTH WEST  
ENGLAND

These positions offer an outstanding opportunity to participate in the initial stages of a planned growth environment by working in a small but professional team. In addition to excellent salaries and company cars, a comprehensive benefits package will be available. For more details on these positions please contact Douglas Woodward on the number below or on Crayford 527062 after 7.30 p.m. or at Weekends.

SPAN

COMPUTER PERSONNEL  
2 Hobart Place London SW1W 0HU Telephone 01-235 3215

## ata Computer Recruitment

### EXPLORATION DATA PROCESSING UK CONTINENTAL SHELF

A major oil Company wishes to appoint a number of Computer Professionals to their Exploration Data Processing Department.

Senior Database Programmer	to £12,000
Database Programmer	to £9,000
Seismic Programmer	to £9,000
Systems Programmer	to £9,000
Graphics Programmer	to £9,000
Junior Seismic Programmer	to £7,500
Junior Systems Programmer	to £7,500

The salaries offered are completely negotiable and are supported by an excellent benefits package. Candidates with relevant experience are invited to submit a Curriculum Vitae to Mr. G. W. Fox, Managing Director, ATA Computer Recruitment, 230 Great Portland Street, London W1N 5HG. All applications will be processed in strict confidence. Company employees have been informed of this advertisement.

SOUTHAMPTON (0703) 37555

LONDON (01) 637 0781	MANCHESTER (061) 832 5856
BIRMINGHAM (021) 643 1994	BRISTOL (0272) 211035
EDINBURGH (031) 226 5381	CRAWLEY (0293) 514071

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Computer Weekly

## MYRIAD

### PROJECT RESPONSIBILITY IN A PROGRESSIVE ENVIRONMENT

Our client, a highly successful commercial group are now keen to appoint additional staff to augment the computer systems development effort for the divisions within the group. Current hardware comprises an IBM 370/138 using Teleprocessing and Database facilities, and a PDP 11/34 is currently being installed to provide for future requirements. The group has a wide range of commercial interests and as such can offer many areas of interesting applications.

### SENIOR SYSTEMS ANALYST

NORTH WEST LONDON TO £8000  
(including bonus)

If you have a proven record as a systems analyst and feel the need to enter a more challenging environment in a senior role then this is the opportunity to effect real project development control.

Ideal candidates will have progressed from a programming background and will have developed and implemented at least one significant commercial system.

The successful candidate will need to be self-motivated and will be expected to assume control of assigned project development.

### PROGRAMMER/ ANALYSTS

NORTH WEST LONDON AND W1  
TO £7000  
(including bonus)

These positions will appeal to programmers or programmer/analysts who are able to design and program systems with the minimum level of supervision. A strong commercial programming background is essential and mini-computer and BASIC experience an asset. Training will be supplied where required and successful applicants can look forward to becoming quickly involved in working with new techniques and making a strong contribution to the computer development effort.

In addition to a generous starting salary the group offers an attractive package of benefits with a project bonus scheme currently in operation. Career development prospects are excellent and are in line with a progressive business organisation. Ref: NW1/0803

MYRIAD APPOINTMENTS LIMITED  
30 Fleet Street London EC4Y 1AA  
01-353 0981

STOP  
PRESS

## This Week's Specials

### JUNIOR AND SENIOR CONSULTANTS

£8,500 to £12,000

CENTRAL LONDON  
Six large, well-established consultancies wish to recruit systems people with all-round experience on third generation equipment and the right personality to deal with clients who require first-rate service. Technical Communications Consultants are also required where in-depth implementation experience of IBM or DEC latest ranges are essential. Excellent fringe benefits and prospects. CW10/7 MICHAEL

### FREELANCE PROGRAMMING VACANCIES

U.K.	to £300 PER WEEK
ICL 2903	COBOL BRISTOL 1 MONTH
ICL 2903	COBOL C. LONDON 6 MONTHS
IBM	COBOL DGB PETERBOROUGH 6 MONTHS
IBM	PL/I OS C. LONDON 6 MONTHS
VERTEX	DATAPOINT C. LONDON 6 MONTHS

OVERSEAS	to £400 PER WEEK
IBM	COBOL C22 OS SAUD ARABIA 6 MONTHS
IBM	OLI DGB C22 PARIS 1 YEAR
ICL	COBOL C22 OS (PROJECT LEADER) FRANCE 1 YEAR
ICL	LOW LEVEL ASSEMBLER BRUXELLES 6 MONTHS

Ring IRENE on 01-885 4148

### JUNIOR PROGRAMMERS

£3,000 to £4,300 S.E. ENGLAND

You have only 1 year's commercial experience? Then you are in great demand. We have a large selection of first-rate companies who need people like you. Some offer mortgage assistance to the right candidates after short period with them. CW 10/2 TRICIA

### PROGRAMMERS, S/A's & PROJECT LEADERS

£4,000 to £7,000 ENFIELD

Why not join an important stable Transport company with the latest H88 computer? All commercial work is now using the latest DATABASE techniques and on-line enquiries are handled from a multiplicity of locations, using Level 8a and other minis. If you have COBOL experience on any byte computer then please apply now. CW 10/3 MICHAEL

### SENIOR OPS/ SHIFT LEADERS

£4,500 to £8,100 inc. NR. FELTHAM

Would you like to work on the latest IBM 3030 machines? If you have good MVS experience and know JCL well, then this top grade Manufacturer and Service Bureau would like to see you. Tip-top perks and paid overtime. CW10/12 TRICIA

### OPERATOR/ DATA CONTROL

to £4,800 inc. CROYDON

A small insurance company requires an operator with 1 year's experience on ICL 2803/4. Only 1 shift system to start with on its new ICL 2804. Holidays of 4 weeks plus L.V.s. CW10/13 TRICIA

### DEC PROGRAMMERS

£4,500 to £8,500 LONDON & HOME COUNTIES

We now have commercial user organisations and 30 Software/Consultancy firms looking for DEC Programmers with 15 months' or more experience. Why not ring us now and enquire about your chance to improve both salaries and status. RSTS or RT11 experience are added pluses. CW10/8 MICHAEL

### RPGII PROGRAMMERS

£4,500 to £7,800 VARIOUS S.E. ENGLAND LOCATIONS

You have never been so popular! A minimum of 8 months' experience as needed. We now have vacancies in HIGH WYCOMBE, W.1. CITY, BRENTFORD, N.W.10, EAST & S.E. LONDON, WIMBLEDY, BRACKNELL, S.E. COAST, GUILDFORD & WORKING. Some companies offer relocation expenses, mortgage assistance, flexitime and bonuses. CW 10/7 MICHAEL

### DATA CONTROL CLERKS

To £4,000 inc. NR. CITY

A major IBM OS Installation in a multinational organisation needs data control clerks to work a 2-shift system. A minimum of one year's experience required and JCL knowledge would be an advantage. The firm offers excellent working conditions, BUPA, CPS, subsidised restaurant, etc. CW 10/8 TRICIA

### SCHEDULER

to £5,000 NR. WORCESTER PARK, SURREY

A chance to get off shift work for an operator with about 4 years' IBM OOS experience. This major electrical engineering organisation has a number of periods which include a subsidised canteen and an excellent SAS club. CW10/9 TRICIA

### DEC OPERATORS

to £5,500 LONDON AND HOME COUNTIES

We now have urgent vacancies for PDP operators in the following locations: the City, Central London, Epsom and W.O.C. under various shift systems. All firms offer excellent perks. CW10/10 TRICIA

### OPERATORS/SHIFT LEADERS

£3,800 to £8,200 NR. RUISLIP, MIDDLESEX

Why not come and work for a large well-organised company in the leisure business? Terrific company perks including free BUPA, C.P.S. and 4 weeks' holiday. All you need is ICL GII experience of one year's minimum. CW 10/11 TRICIA

### SYSTEMS SUPPORT MANAGER

to £7,700 W.1

A major cloth manufacturer based up north requires a Southern based systems person to work in London at their major computer installation on user education, systems implementation and general operation methods. Your specific computer background is not as important as your ability to organise and deal with people. CW 10/4 MICHAEL

### CUSTOMER SYSTEMS SUPPORT

to £5,500 + CAR C. LONDON

This major international (airline and motor) manufacturer requires three first-class Systems Analysts to advise, design and implement a variety of Real Time applications based around Mini or O.E.M. Mainframe Computers. Excellent opportunity for advancement and top company perks. CW10/5 MICHAEL

### PROGRAMMERS & OPERATORS

FREE LIST  
of vacancies to suit you  
ALL AREAS

Phone now 01-626 0171

The best CHOICE of  
Computer Appointments

129 Cannon St.

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### JOHNSON GROUP CLEANERS LTD.

seeks a

### COMPUTER OPERATOR

An opportunity has arisen, due to the

expansion of our staff working, for a

senior operator with three years' plus

experience of ICL 2803/4 or 1800

machines. If you have a good knowledge

of ICL 2803/4, please send your CV to

Mr. L. P. Clarke, Johnson Group

Management Services, 100 New Bond Street

West, London, W1 2DB Tel. 01-629 224

Ref: JCL 244

DE HAVILLAND COLLEGE

The Campus

Welwyn Garden City

Herts

### HEAD OF DEPARTMENT OF COMPUTER STUDIES

(GRADE III)

Applications are invited for the

above post, based at Elstree Way,

Bovingdon, Wood, which becomes

vacant from 1 May, 1979.

Applicants should be graduates

with a first class honours degree in

computer science, and preferably

with a teaching qualification.

Further particulars and an appli-

cation form from the Principal at

the above address, so be returned

by Monday, 19 March.

## WE ARE LOOKING FOR HIGH FLYERS...

### RPGII PROGRAMMERS SOFTWARE SPECIALISTS

RENDECK ARE TAKING OFF IN THE UNITED KINGDOM

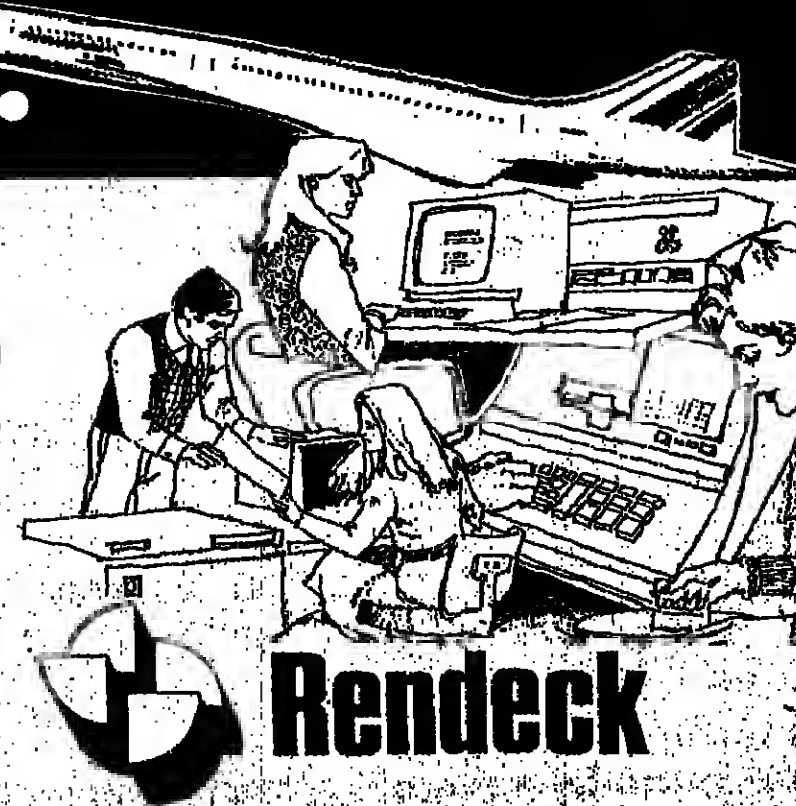
We are an international group of companies with a reputation for top quality computer systems development. The budgeted turnover is £4 million with a staff of 140. The further development of our existing UK company is the major expansion plan planned for 1979. The experience gained in the United States and Europe will help ensure we fly in the right direction.

### YOUR CAREER TAKES OFF WITH RENDECK

Right now we need top-class RPGII PROGRAMMERS, preferably with sound experience of Financial and Insurance systems. We also have a need for SOFTWARE PROGRAMMERS with at least 3 years' REAL-TIME experience, to work on projects in the Home Counties, South Coast and London.

We realise the worth of top quality people so the rewards we are offering will also be sky-high.

TAKE OFF TODAY: CONTACT  
Bridget Kitchie, RENDECK LTD, 100 New Bond Street  
London W1Y 9LF. Telephone: 01-629 5438/6068



Recruitment Consultants  
UNIVERSAL COMPUTER ASSOCIATES LIMITED

01995 3883 (01958 6138 Evenings)

Data Express House, 3 Prospect Place, Heathfield Terrace, Chiswick



1570







# MYRIAD

## PROGRAMMERS

### NEW MINICOMPUTER & MAINFRAME DEVELOPMENT

#### W. LONDON

Our Client a highly successful commercial group based in West London is now embarking on a new phase of project development utilising mini-computers linking a country-wide system network. Currently therefore they are able to offer programmers a real opportunity to stay at the forefront of computer systems development into the 1980s.

The group can offer a very favourable benefits package with competitive starting salaries and attractive bonus scheme as well as all the facilities offered by a large employee conscious organisation.

MYRIAD APPOINTMENTS LIMITED  
30 Fleet Street London EC4Y 1AA  
01-353 0981 24 HRS.

**c £6000**

Successful applicants who can offer at least eighteen months' commercial COBOL programming experience from either a mini or mainframe background will be given the scope to become fully conversant with on-line, distributed processing and database techniques. Where required technical training will be supplied to enable successful candidates to contribute effectively to this important project development.

### SENIOR SALES EXECUTIVES RETAIL SYSTEMS EARNINGS: £12-£15,000

The company is one of Europe's leading suppliers to the retail sector, having a product range which incorporates mainframe and mini-computers, as well as specialised terminal equipment.

To further enhance its strong position in the retail sector, the company will now appoint three experienced sales executives at senior grades. These people will have a solid sales track record to their credit, having earned their spurs selling mini-computers, intelligent terminals, small mainframes or services. Knowledge of retail applications, such as Point-of-Sale, would obviously be an advantage, but it is not essential. The earnings package will be negotiated according to experience, but you can expect to earn at least £12-£15K in your first year, including a basic salary of not less than £8,500.

Contact: TONY BAKER, 01-499 4501 (24 hour answering service) during business hours. Or 01-445 3512 at other times.

REF. RW 10/1

### MINI-COMPUTER SALES

P.E. £15,000  
+ Car

My client — a well-known and respected mini-computer manufacturer — wishes to engage one senior sales executive to handle National Accounts.

The product is already to be found in many large-scale T/P networks, and the job will be to enlarge the company's penetration in this highly lucrative and growing market.

A sound track record is essential, probably earned in mainframe account development selling. Candidates will have a mature approach, coupled with a sound technical and commercial grounding. Location is not important, but there is a slight advantage in being resident in the South-East.

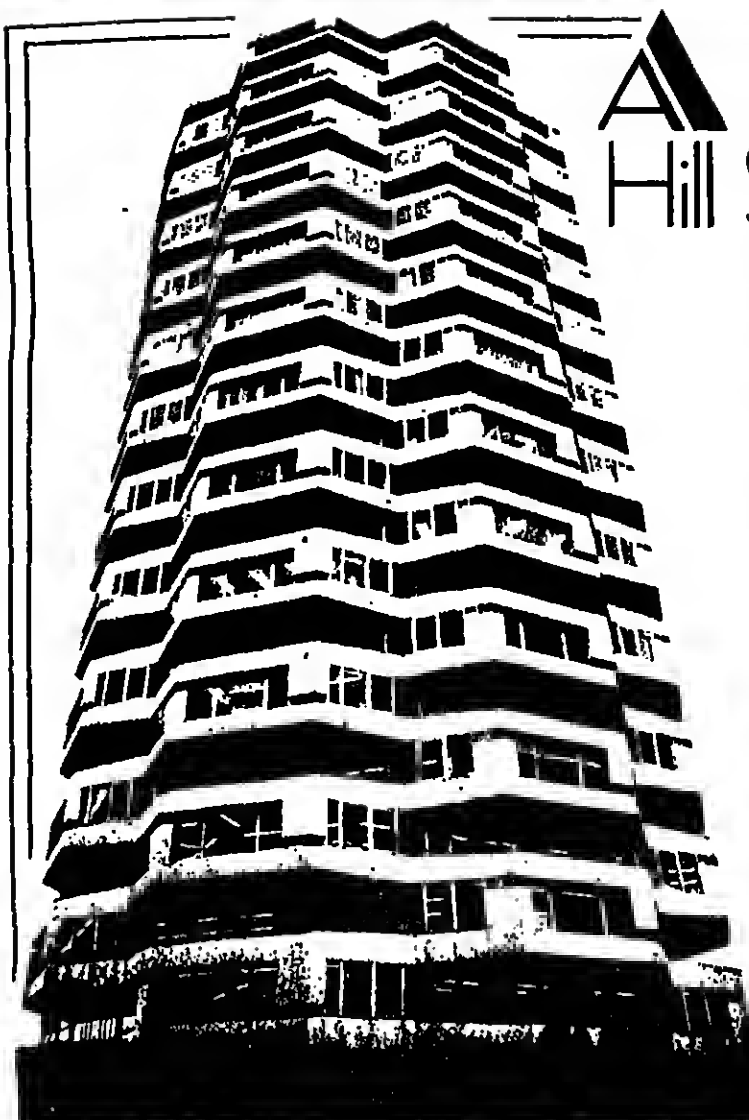
Contact: TONY BAKER, 01-499 4501 (24 hour answering service) during business hours. Or 01-445 3512 at other times.

REF. RW 10/2

**hutchinson-scoggins recruitment**  
47/48 New Bond Street (entrance in Maddox Street)  
London W1Y 0HE Telephone 01-499 4501

### Management and Executive Selection

"We'll Help You Find the Needle—  
We Know the Haystack!"



## A PLACE TO GROW Hill Samuel Life Assurance Croydon

You will have the opportunity to grow if you have the skills and ability. H.S.L.A. provide the place and now they want the people. A developing D.P. environment, expanding into new technology and diversifying into new application areas requires people who can identify and solve problems sensibly and effectively. All these jobs offer a clear, established career path, which provides job satisfaction and increasing rewards.

### SENIOR ANALYST & SYSTEMS ANALYST £6,600-£8,000

We want people who will do a good job immediately and who have potential to move into more senior positions in the department. Although technical skills are important, personality, commonsense, intelligence and an enquiring mind, coupled with the ability to get on well with users, is essential.

We naturally look to the Senior Analyst to have more experience — three years as an Analyst with the completion of a major project capable of accepting responsibility for large systems as a Project Leader and of implementing to time and budget.

The Analyst will lead, initially, smaller projects and will have successfully specified and implemented at least one system.

Both positions require a programming background and experience of insurance systems, whilst not mandatory, is advantageous.

The picture shows the NLA Tower, the modern air-conditioned office block which houses the data processing department of Hill Samuel Life Assurance. The company is fast growing, specialising in annuities, life assurance and unit-linked pension plans. HSLA is a part of the Hill Samuel Group which has extensive interests, primarily in the Banking and Insurance sectors. HSLA uses an IBM 370/158, operating under OS MVS with both batch and interactive systems live. An IBM 3790 is on order to provide distributed processing facilities and on-line program development under TSO will commence in 1979.

### ANALYST/PROGRAMMER Circa £6,000

This position is for a Trainee Analyst who has three years IBM COBOL experience including program design. With training the Analyst/Programmer will take control of small applications and existing system enhancements and will complete to time and budget.

### PRODUCTION CONTROLLER £3,500-£5,500

To accept responsibility for production systems from control of input data to distribution of output, communicating with users and trouble-shooting if problems arise. Control of terminal operations and close liaison with the computer facility are required.

Experience will include an operations background, preferably with previous production control and JCL involvement on a large IBM 370 under OS.

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Are you the person to tackle a wide variety of problems, applying systems and supporting these with a 4th Generation computer? You would work within a small group actively engaged on all aspects of Management Services associated with the identification and satisfaction of the Council's needs overall. Post (a) will play a major support and occasionally lead role, whilst post (b) will provide the supporting role on projects involving feasibility, research, systems design and implementation. For both posts a degree and/or Business Studies qualification is preferred together with proven training across/within the areas of Computer Systems, Information Systems, Nature and Role of Information, with practical and working experience.

For application form please telephone our 24-hour recruitment answering service 01-837 8888 or send postcard to the Chief Executive, London Borough of Camden, Town Hall, Euston Road, London, NW1 3UL, stating post and appropriate reference number.

Camden - an equal opportunity employer

Applicants are considered on the basis of their suitability for the post regardless of sex, race or marital status. Also required: disabled persons with the necessary strengths are welcome to apply.

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We now require Computer Operating staff to work with both of these installations. The job is a challenging and stimulating one and, if you have already obtained large systems experience, preferably with Burroughs equipment, we would like to hear from you.

Our Southampton offices are modern and air-conditioned, and relocation expenses will be paid where appropriate. Salaries of either £3433 + 20% shift allowance of £3824 + 20% shift allowance will be dependent on experience. The company offers, in addition to salary, an attractive range of fringe benefits which includes luncheon vouchers, flexible working hours and company pension plan.

For further information or an application form please write or telephone: Mrs. L. Lacey, Assistant Personnel Officer, ACT Services Ltd., Richmond House, Terminus Terrace, Southampton SO9 1GC.

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City of  
Nottingham

## City Treasury

The City Council have an ICL 1803A computer which will be replaced by an ICL 2960/2MB in October 1979 to allow a substantial expansion of services over the next few years. The on-line program development service is to be provided. The staff establishment has been reorganised and enlarged and the following vacancies are to be filled:

## Senior Programmers

SD1/2 £5,232-£6,060 per annum including supplement

Applicants should preferably have at least 3 years' experience of programming in PLAN and COBOL and be capable of handling a small team of programmers in development, conversion and maintenance projects. Relevant qualifications will be an advantage.

## Programmers

C.1 - AP.5 £1,656-£5,073 per annum including supplement

Applicants should preferably have at least 1 year's experience in PLAN or COBOL. The starting salary will depend on experience and qualifications.

Assistance with housing accommodation and payment of removal expenses, lodging allowances or travelling allowances may be provided in approved cases for other than the above posts. Appropriate training for 2000 will be given. Further details may be obtained if required by telephoning Mr. Farmer (0202 48671, Ext. 133). Applications with the names and addresses of two referees should be forwarded to the City Treasurer, Guildhall Nottingham NG1 2DE by 23rd March, 1979. Please see ref. CT/1830/1.

MANAGEMENT &  
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Required by the Tourism and Recreation Research Unit.  
Applicants should possess experience in IMP or ALGOL. The work will involve the assembly and preparation of various survey data sets and map frameworks, as well as the production of statistical and spatial analyses using standard packages and special purpose programs.  
Starting salary will be (gross rate) on scale £3,363-£4,362, under review.  
Further particulars may be obtained from TRRU, High School Yard, Edinburgh, EH1 1NR. Telephone 031-558 1511. Applications should include CV, details of relevant experience and names of two referees and should reach the Unit by March 23rd. Please quote Reference 5010.

NORTH WESTERN REGIONAL HEALTH AUTHORITY  
COMPUTER SECTION

## SHIFT CONTROLLER

Salary £4,889-£6,025 per annum

Applications are invited from experienced computer people to fill this post in the operations section. The person appointed will have supervisory ability and experience of controlling and scheduling the processing of data and must be prepared to work on a shift basis for which additional allowance of 15% of salary is payable. The job does not involve overnight or weekend work.

Application forms and further details from Regional Administrator, North Western Regional Health Authority, Grosvenor House, Piccadilly South, Manchester M60 7LP, or fax to information telephone Mr. R. Dyson on 061-773 9211, to quote reference number 1740A. Closing date 22nd Mar 1979.

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We are looking for a Field Service Engineer (ref CE/2) to provide preventive and corrective maintenance at user sites in the Oxford area. He or she will have previous experience servicing computers and associated peripherals. An ONC or HNC in electronics or computing is desirable, but not essential. Whilst the position will clearly be of interest to engineers living in the area, relocation expenses will be paid should the successful candidate wish to take the opportunity to move to Oxford from elsewhere.

Both positions will attract an excellent salary and benefits, and a company car.

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Our clients are a well-established company based in Bristol and require an experienced PLAN Programmer. The position involves the support of client systems and the tailoring of packages to suit individual client requirements. The successful applicant will also be given thorough training in BASIC as it is envisaged that he/she will also be involved in the development of mini/micro computer applications.

For further information ring 0272 211035

### CUSTOMER SUPPORT OPERATIONS to £7000 p.a.

The successful applicant will be fully conversant with the problems and solutions of conversion from 1800 series to 2800 series under VMSE.

Ideally he/she will also have had experience of liaising with users and be able to communicate effectively not only to C.P. staff but also non-computer orientated personnel.

### PRE & POST SALES £6000 + Car allowance

A Systems Analyst is required to provide pre and post sales support for a mini manufacturer. The ideal candidate will have an all-round commercial background, preferably with RPG II programming experience. The salary is negotiable circa £6000. In addition a tax free car allowance of £804 p.a. and mileage rate is payable plus a discretionary bonus.

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## Programmer

N. London, to £6,000

This major International manufacturing company intends expanding the DP facilities at its North London Head Office and is currently evaluating new equipment to replace the heavily overloaded IBM 370/115. TP and distributed processing feature prominently in the plans. In anticipation of these developments a new position has been created for which we require a

young enthusiastic programmer ideally with two or more years COBOL experience. The successful candidate will immediately become involved in the redevelopment of existing applications designed to achieve a fully integrated system. Career prospects are excellent with this progressive organisation and there is an attractive range of fringe benefits.

E. Sutton, Ref: 17057/CW

Male or female candidates should telephone in confidence for a Personal History Form to:  
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Our client is a multi-national high technology company willing to pay over the odds for someone with around 2 years RPG II experience.

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Applications are invited from suitably qualified persons for the above post, which is tenable from 1st May, 1979.

Further details and application forms, returnable within 14 days of the appearance of this advertisement from the Principal, Stevenage College, Monkwood Way, Stevenage, Herts SG1 1LA.

## Software Designers & Senior Programmers

North London to £7000

Our client, part of a large multi-national group, is currently developing a new range of highly sophisticated communications equipment.

The equipment is built around a new central communications processor and uses microprocessors as control units for the peripherals.

They now need Software Designers to take responsibility for the detailed design of the new operating system and its applications software and Senior Programmers to control and participate in its development. Successful candidates can expect to be closely involved with users, hardware engineers and OEM suppliers in developing this exciting new project.

Suitable candidates will possess in excess of three years experience in specialist software development and have gained some experience in I/O and file management techniques. Experience in working in a small project team environment is desirable. Essential is solid experience in an Assembler level language and a good knowledge of technical systems design.

Ideally, candidates will be aged 22-28 with a degree and have the presence and ability to liaise with the various interface points both within the company and outside.

The company offers a good range of benefits which includes full relocation and temporary accommodation if necessary.

To discuss these opportunities in more detail telephone Mr. Holliday or write in strictest confidence quoting reference MGH 2125.



**Lloyd Chapman  
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123, New Bond Street London W1Y 0HR 01-408 1670

## Senior Analysts and Programmers

Hampshire to £7,000

Plessey Management Services has a small number of vacancies for experienced Systems Analysts and Programmers, within both the Company's Central Development team and its Regional Systems Development Teams. Projects currently encompass financial, production, engineering and commercial systems, utilising batch processing, on-line, and database techniques.

The development and support teams have access over the Plessey network to ICL 1906S and 1906A machines at the Plessey Computer Centre. Plans are in hand for the introduction of 2900 mainframes. Additional diversification into distributed processing, based on 2900, various minis and word processing configurations, is also planned.

Both departments are located at Titchfield, in attractive rural Hampshire, which offers easy access to the recreational facilities of the countryside and the South Coast, yet is close to all the amenities offered by Southampton and Portsmouth.

Applicants should have at least 2 to 5 years EDP experience in manufacturing industry, ideally including COBOL, Fortran, George J, and on-line and transaction processing.

Salaries will start in a range between £5,000 and £7,000. There is a first class benefits package, including relocation expenses where appropriate.

For further information and an application form, please ring or write to Mrs. L. J. Dawson, Personnel Officer, The Plessey Company Limited, 2-60 Vicarage Lane, Ilford, Essex. Tel: 01-478 3040 Ext. 2051.

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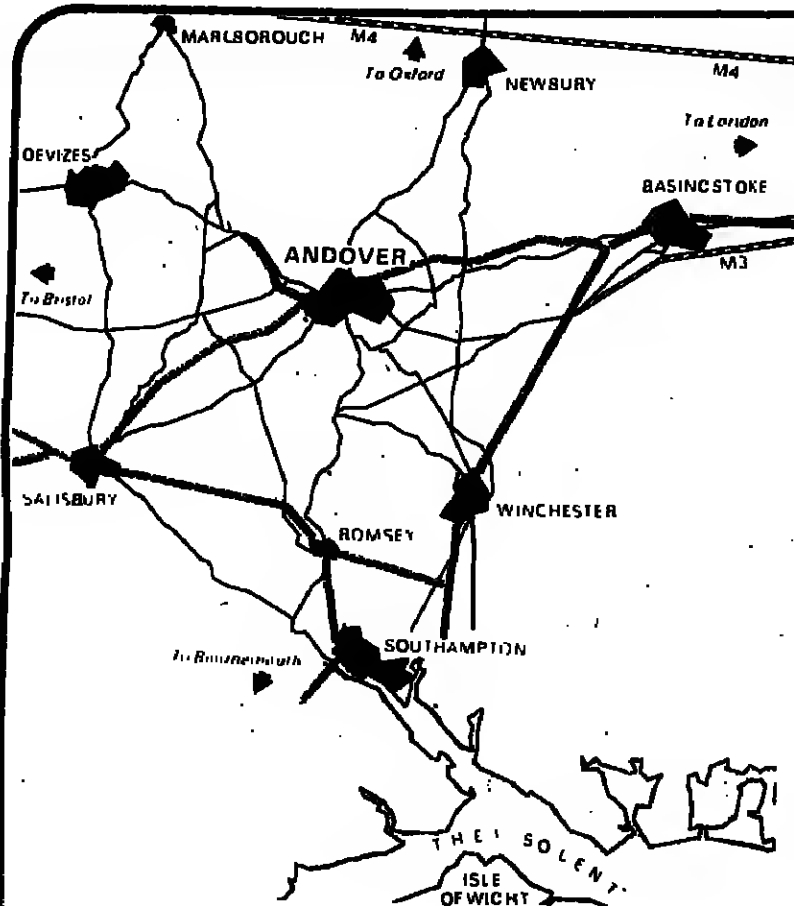
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A stimulating career in an expanding, prestigious company, where individuals matter, particularly in terms of career objectives and personal achievement. The following features are part of the employment package which substantially increase gross salary figures:

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#### SENIOR PROGRAMMERS up to £6,300 + benefits

Candidates for these positions will have a number of years experience of programming on real-time terminal systems in COBOL. Particular experience in insurance, banking or financial applications will ensure serious consideration as will a knowledge of Burroughs equipment. Successful candidates will assume a high degree of responsibility, after any initial training, and opportunities will exist for wide diversification. A knowledge of ALGOL will be useful for some vacancies.

#### SYSTEMS ANALYSTS up to £6,000 + benefits SENIOR SYSTEMS ANALYSTS up to £7,200 + benefits

Systems Analysts with a track record on insurance or financial systems development will be particularly suitable. The company is dedicated towards terminal network processing with DMS2 and previous work in this type of system is very desirable. A programming background is not essential but deemed necessary for some of the vacancies. Successful applicants will assume project responsibility within a short time, depending on the personal ability and skill of the individual.

# ANALYSTS & PROGRAMMERS



Systems Analysts and Programmers are required for this expanding Data Processing Department. Analysts should have a Commercial Systems background, and a knowledge of Accountancy based systems would be an advantage. There is a high degree of development work involved in this batch and on-line environment. Opportunities exist for rapid advancement in both Project Leadership and other areas. Our clients have always been interested in recruiting top calibre staff to join their professional team and consequently will be interested to hear from Junior Analysts or Programmers wishing to move into Systems.

ICL COBOL and PLAN Programmers are also required to work both in a Technical Support function and in general application areas. In both cases a well defined career structure is offered and, as your career and experience progress, you will be given every opportunity to move into the area that suits your abilities.

Our clients are an International Corporation with their Computing Headquarters on the North London/Hertfordshire borders.

The company utilise ICL 1900 hardware running under GEORGE II+, software includes COBOL, PLAN and DATADIVE.

Our clients consider it important, in their commercial environment, that Programmers and Analysts specialise in their own fields and are consequently well rewarded by both high salaries and job satisfaction.

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For more information on these posts please contact ANJELA WALSH at the number shown below.

## SPAN COMPUTER PERSONNEL 01-235 3215

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## Data Processing Manager

Major Insurance Company Surrey  
CIRCA £12,000 plus CAR and substantial benefits

Our client is a well-known insurance company whose administrative Head Office is located in mid-Surrey. The Company handles all classes of insurance through 50 branches located throughout the U.K. and many other offices located in other parts of the world.

The existing Data Processing Manager is shortly to be promoted and the Company wishes to recruit a replacement.

The Department has a staff of over 100 and operates on IBM 370/145 which will shortly be supplemented with a 3031. Current systems support a large number of local and remote terminals. A countrywide Distributed Processing Network is under development.

The new Data Processing Manager will be expected to control all aspects of operations and systems development. Our client expects to recruit a thoroughly experienced, professional Manager to control a fast growing and forward thinking department.

Experience in the insurance or financial sectors and with IBM equipment is preferable, but not a prerequisite.

The successful applicant must be able to demonstrate the ability to manage a department with an operating budget approaching £1 1/2 million.

The position offers very substantial benefits including:

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Ref. 2291/CW.



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Ref. 1073

JUNIOR PROGRAMMER  
SOLIHULL

18 months' programming experience in any language is required by our client. CAR allowance offered.  
Ref. 1099

SYSTEMS ANALYST  
STAFFORDSHIRE

Our client requires analysis of varying experience from approximately one year upwards.  
Ref. 1098

OPERATIONS PLANNING ASSISTANT  
STAFFORDSHIRE

Experience in IBM OS/VS is required by our client for this technical support role.  
Ref. 1092

COBOL PROGRAMMER  
CHESHIRE

Three years' programming experience required. To work on IBM 370 under OS/VS in expanding data centre.  
Ref. 1091

SYSTEMS PROGRAMMER  
MANCHESTER

Two to three years' experience in OS/VS1 IMS/VS and DB/DC is required for our client.  
Ref. 1095

JUNIOR PROGRAMMER  
MANCHESTER

Minimum working experience of 6 months COBOL is required by our client. Commercial environment. General benefits offered.  
Ref. 1093

SYSTEMS PROGRAMMER  
STAFFORDSHIRE

Software involvement, experience in assembler, JCL, OS and VS an advantage.  
Ref. 1093

FOR DETAILS OF THESE AND OUR OTHER VACANCIES PLEASE CONTACT JOAN JOHNSTON  
143/144 ROYAL EXCHANGE, MANCHESTER. TELEPHONE NO. 061-833 5341/5  
DATA PROCESSING RECRUITMENT SPECIALISTS

SCIENCE RESEARCH COUNCIL  
COMPUTER PROGRAMMERS  
FOR SPACE RESEARCH

APPLETON LABORATORY has vacancies for COMPUTER PROGRAMMERS to work on data processing and control in support of a major International Satellite project, the Infra Red Astronomy Satellite (IRAS), which will be launched in February 1981. The Science Research Council has the responsibility for providing the satellite control centre and a scientific data analysis centre for this project which is a collaborative venture with the United States and The Netherlands. The main computers that will be used are two PDP 11/35 machines and a large ICL mainframe. Programmers are needed in the following areas:

real-time software  
large-scale data base handling  
orbit and attitude analysis  
scientific data processing

Posts will be available at both Scientific Officer and Higher Scientific Officer level. Applicants should have a degree, HNC, HNC or equivalent qualification in Science, Mathematics or Computer Science, with at least two years' programming experience for the higher posts. The posts will initially be located at Otton Park, Slough, but will probably be transferred later to Chilton, Oxfordshire.

Salary will be on the following scales (Outer London Weighting Allowance included), the exact step depending on qualifications and experience: £4378-£5723 for an HSO or £3114-£4680 for an SO.

Non-contributory pension scheme.

Please request an application form from:

The Secretary  
Science Research Council  
Appleton Laboratory  
Otton Park, Slough SL3 9JX  
Tel: 0494 44284, Ext. 153

Closing date: 5 April, 1979

Goods Inward  
Inspectors

required to join CTL, the British Computer Systems and Software Company at Hamel Hempstead.

We currently have opportunities for both electrical and mechanical Goods Inward Inspectors who, as part of a small team, will be responsible for inspection and acceptance of all piece part and peripheral material.

Candidates ideally will have served a recognised trade apprenticeship and have previous inspection experience. However, other candidates who are familiar with the tools of the trade and have the ability to read manufacturing drawings and specifications will also be considered.

Salary negotiable according to experience with excellent benefits and opportunity for overtime.

Please write or telephone for an application form/further details to: Julie Rigden, Personnel Officer, CTL, Easton Road, Hamel Hempstead, Herts HP2 7EG. Tel: Hamel Hempstead (0442) 3272.



The British Computer Systems and Software Company

Owing to expansion and the introduction of two-shift working the following posts have been created within our Computer Operations Department which is using an IBM 370/158 running under OS/VS, POWER/VS, CICS and VSAM.

SENIOR  
OPERATOR/CONTROLLER

Ref: CW/167  
From £5189 p.a. inc.

Will be responsible to the Production Controller by hour-by-hour operation of the Computer Room and its Controllers.

We are looking for someone with at least two years' operating experience — one of which must have been capacity of Senior Operator — a good knowledge of JCL, Work Control procedures.

## OPERATOR/CONTROLLER

Ref: CW/168  
From £4102 p.a. inc.

For this post we are looking for someone with a minimum of one year's operating experience. A knowledge of work control procedures and DOS JCL would be a decided advantage.

Both posts have a minimum of 22 days per year and have a subsidised restaurant and a Sports and Social Club.

The Royal Borough of  
KENSINGTON AND CHELSEA

Application form quoting appropriate references to be sent to the Establishment Officer, Dept. 151, The Town Hall, Hampton Street, Kensington W8 7JX. Tel: 01-427 8682 (24-hour answering service). Application forms to be returned by 28th March, 1979.

The council welcomes applications from suitably qualified registered disabled persons.

MARKET INTELLIGENCE  
EXECUTIVE

c.£6,000

WOKING

B.A.T. (U.K. & Export) Limited is a rapidly increasing force in the U.K. cigarette market. We need expansion in the information services to match the expansion of our business.

Because of this rapid growth the opportunities for developing skills and for promotion are excellent. The person we are looking for is probably over the age of 23, of graduate capability and will be able to handle work involving computer systems (both in-house and bureau) and have a strong numerate capability.

As well as these abilities we need someone with an outgoing personality who is able to communicate effectively at all levels, verbally or in writing.



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If you are looking for an opportunity to widen your experience, have more varied work, more responsibility, and be positively encouraged to use your initiative, then this could be it.

The offices in Surrey are modern, lunches are free, there is a non-contributory pension scheme, life assurance plan and four weeks holiday.

Starting salary will be around £6,000 depending on age and ability.

Please write with full career details, including salary progression, to:

Miles M.T. Stone,  
Personnel Manager,  
B.A.T. (U.K. & Export)  
Limited, Export House,  
Woking, Surrey GU21 1YB.

Graduate  
plus two years?

If you have two years' computing experience now is the time to acquire some microprocessor expertise.

At Marconi Avionics we provide training in design techniques and CORAL.

At plants in Borehamwood, Welwyn Garden City and Radlett, all in Hertfordshire, we are writing software for TEXAS, MOTOROLA and INTERSIL microprocessors and we need programmers and engineers for several small projects.

So if you are a graduate with two years' programming

or hardware experience and are interested in working with microprocessors please ring Norma Coulter on 01-953 2030 ext. 3771. Alternatively write to H.E. Batchelder, Marconi Avionics Limited, Elstree Way, Borehamwood, Herts. Please quote reference MA79017. These posts are open to both men and women.



Marconi Avionics Limited

HEAD OFFICE  
SENIOR PROJECT  
OFFICERS

£5,988-£6,438

## PROJECT OFFICERS

£4,323-£4,850; £4,821-£5,181; £5,370-£5,772  
All salaries plus £312 p.a. supplement.

The Authority is to replace its existing twin ICL 1904S installation running under OS with a larger 2800 by 1980/81. For this project we need computer professionals with sound experience in at least two of the following:

COBOL programming; FORTRAN programming; systems analysis and design; operating systems; systems software; communications hardware and software; operations.

The senior project officers must have at least five years' computer experience, including some at supervisory level. One of the Project Officers will be involved in the conversion of the technical systems and experience in this type of work would be an advantage.

Application forms and further details from:

The Director of Personnel & Management Services, North West Water, Dawson House, Great Sankey, Warrington, Cheshire WAB 3LW. Telephone: Penketh 4321 Ext. 84.

Closing date: 23rd March, 1979.

The above posts are open to men and women



## CITY OF BIRMINGHAM POLYTECHNIC

SENIOR  
PROGRAMMER  
(2 POSTS)

Salary: Grade AP1V £4,245-£4,832 (inclusive)

Required in the Computer Centre which operates an ICL 1902S (32K) and is proposing to install other computer equipment. A working knowledge of at least two languages and experience of Educational Computing would be an advantage.

Further details and application forms (to be returned within 14 days of the appearance of this advertisement) from: The Personnel Officer, City of Birmingham Polytechnic, F Block, Perry Bar, Birmingham B42 2SU.

THE POLYTECHNIC  
HUDDERSFIELD  
DEPARTMENT OF COMPUTER STUDIES  
AND MATHEMATICSPRINCIPAL LECTURER —  
COMPUTING/INFORMATION  
SYSTEMS

Ref: ACA/807

The principal degree and diploma courses within the Department involve major studies of applications of computers in business, industry and public authorities.

The successful applicant should have appropriate academic and practical experience to promote and lead specialised studies relevant to these courses. A good Honours Degree and/or MBCS is essential.

Staff are expected to undertake activities including research, in addition to teaching duties.

Salary: £7047-£7818 (Bar) - £8544.

Further details and application forms, which should be returned by 22 March, 1979, from the Personnel Office, The Polytechnic, Queensgate, Huddersfield HD1 3QH. Telephone 0484 22288, Ext. 2228.

BRIGHTON POLYTECHNIC  
FACULTY OF MANAGEMENT AND INFORMATICSDEPARTMENT OF COMPUTING  
AND CYBERNETICS

Applications are invited for the following posts:

## 1. Reader in Computing

Candidates should have a record of successful research in Computing and be able to lead and develop Computer Research in the department.

2. Lecturer II/Senior  
Lecturer (two posts)

(Post 1) In Computer Science with particular interest in Programming Languages.

(Post 2) In Computer Science with particular interest in Data bases.

Salary Scales:

Reader: £8073-£8844  
Senior Lecturer: £6051-£7572  
Lecturer II: £4101-£5558

For further details and application forms please apply to the Personnel Officer, Brighton Polytechnic, Moulsegrove Road, Brighton BN2 4GJ. Tel: 0273 893665 Ext. 2532. Closing date: 2nd April 1979.

CAPP ASSOCIATES group provides permanent and contract recruitment services to clients and applicants

## Operators

N. London

C. £5,000

The company, an international group manufacturing and exporting pneumatic power tools, is successful. So is the data processing department, such that it is used as a reference account by the computer manufacturer.

The mainframe is the latest technology Honeywell 64/50, 512K, with seventeen terminals and 1400 MB of disc — a substantial configuration.

The requirement is for two Operators, to work with the existing two Operators, covering a day and evening shift system. Honeywell/GCOS experience would be ideal, but applicants with other experience should certainly apply. The salary is around £5,000 per annum including shift allowance, with paid overtime.

One vacancy is occasioned by a promotion into programming, indicating the possibilities for progression. The offices are in Hendon, North London, convenient for bus and the northern line tube, also close to the start of the M1. The department is extremely friendly, there is a subsidised canteen and an active sports and social club.

We feel we can recommend these positions, so for more details please telephone (24-hour service) for an initial discussion, write with details of experience or simply complete the coupon and send it to the address below.

Please contact me with more information regarding the operating positions in Hendon.

NAME \_\_\_\_\_  
ADDRESS \_\_\_\_\_

Home Tel. No. \_\_\_\_\_ Bus. Tel. No. \_\_\_\_\_  
(Used Directly)



Positions open to male & female applicants, QUOTE REF. CW 114 DT.



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LONDON AND MANCHESTER



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Customer  
Support

more variety, challenge and reward  
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Training and Standards Support

Major reorganisation of the Rank Xerox International Data Centre in Bushey has led to vacancies in our Central Customer Support Group which is responsible for supporting all aspects of our users' computer usage across Europe utilising our three computer centres in the U.K., France and Germany.

Each centre operates IBM 370/158's with OS/VS2 with a large Remote Job Processing network and a number of Interactive VDU systems. Men and women are required at all levels in the three main sections of Customer Support as follows:

## Batch Systems and Interactive Systems Support

Senior — with at least 4 years IBM OS experience and a detailed knowledge of IBM assembler.

Intermediate — with at least 2 years IBM OS experience and a knowledge of assembler or a commercial programming language.

Junior — with at least one years IBM experience.

For the Interactive Systems Support positions, preference will be given to those with on-line experience.

with proven ability in the area of EDP education, a detailed knowledge of IBM and experience in the compilation and control of Data Centre records.

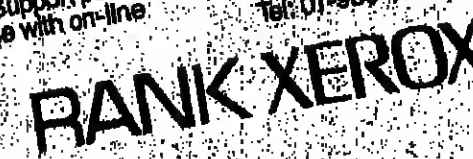
with either proven ability in EDP education or IBM experience and a technical background.

Applicants for all these demanding positions must be able to demonstrate confidence in attempting to tackle any task.

We also have a small number of vacancies for Trainees and candidates should have a good academic background and preferably some previous exposure to computing.

Competitive salaries are in the range indicated and an excellent benefits package includes 4 weeks holiday, rising to 5, generous pension, life assurance and sickness benefit schemes, subsidised staff restaurant, active sports and social club, and, where appropriate, relocation expenses.

For more information on these outstanding career opportunities, contact Brian Spence at Rank Xerox Limited, Phoenix House, High Street, Bushey, Herts. Tel: 01-850 4030.



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# Contract Vacancies



## NORTH WEST

IBM 370 IMS COBOL Programmers  
ICL 1904 GIII Cobol/Plan Programmers  
ICL 2904 Cobol Programmers  
IBM 370 IMS PL/1 Programmers  
Univac 1100 Assembler Programmers

## YORKSHIRE

IBM 370 PL/1 Programmers  
ICL 2904 Analyst Programmers  
ICL 2900 Driver/Cobol Programmers

**SDM OFFER:**  
GOOD RATES OF PAY  
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**LONG CONTRACTS**  
ASSISTANCE WITH COMPANY  
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## SDM Computer Services

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## NORTH EAST

Honeywell 66 TDS Programmers  
ICL 1900 Cobol Programmers  
IBM 370 Cobol Programmers  
IBM 370 OS Cobol IMS Programmers  
PDP11/70 Basic Plus

## SOUTH

Honeywell 66 IDS Cobol Programmers  
IBM 370 PL/1 Programmers  
Univac 1100 Analyst

### SDM COMPUTER SERVICES

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our applicants, our service

## SUPPORT MANAGERS & SENIOR CONSULTANTS

c. £9,000 to £11,500 p.a. + bonus

### MAJOR COMPUTER MANUFACTURER

Due to significant success and growth, our client is looking for experienced professionals, who can operate in a pre and post sales support environment, where the growth in business is expected to double over the next 3-4 years. All types of systems are involved, from large mainframes to terminals.

They require:

**SENIOR CONSULTANTS (PRE SALES)  
COMMUNICATIONS CONSULTANTS  
OPERATING SYSTEMS CONSULTANTS  
TERMINAL SYSTEMS CONSULTANTS  
PRE AND POST SALES SUPPORT MANAGERS**

These positions offer EXCITING and REWARDING career opportunities.

Please phone or write to the Account Director, quoting ref. no JFEG-7.



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LONDON W1M 4AJ PHONE 01-486 5644



## SYSTEMS ANALYSTS

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- \* Start up to £7,000
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- \* Worldwide commercial organisation
- \* Big d.p. expansion plans
- \* Relocation expenses

Our client needs systems analysts right now.

The initial task is to develop a number of new on-line systems in time for the arrival of a big ICL 2980 in Spring next year.

This is an ambitious schedule so we are particularly interested in people who can make things happen quickly. You should also have previous systems implementation experience.

The company has a d.p. growth plan which offers unrivalled scope for personal development. For example, you could find yourself working with micros for the regional offices or establishing communication links with minis in the manufacturing locations or helping establish a relational database on the central mainframe.

Whatever it is, there won't be time to stand still. And the rewards will be high in terms of job satisfaction, salary and status within the company.

There is also a package of big company benefits which includes the payment of relocation costs where appropriate.

To discuss these opportunities further please call Sylvia Walton or send your c.v. to:



**Castle Computer Services Limited**

27, High Street, Berkhamsted, Herts. TW/Phone: (04427) 73151

## CONTRACTS

### HOLLAND

Nixdorf Assembler  
IBM Systems Programmer with managerial experience  
IMS Analyst  
IBM Assembler TROPICS

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PDP RSX11 M or D  
RSTS/E  
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Basic +

Mini Assembler

### N. ITALY

Communications Network Designer  
Mini Assembler Message Switching

### U.K.

IBM Cobol OS Programmer  
Financial Systems Analyst  
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H 8000 CBL Programmer  
B/A Production Control  
IBM CBL/BAL Programmer  
IBM Sys. 3 RPG2  
M 8800  
Intel Assembler  
IBM CBL DOS Programmer

These are just a few of our current requirements. For information about these and other opportunities we have telephone Stephen Trigg or Jocelyn Homewood on:

**BRENTWOOD (0277) 212021**

LINSCOTT COMPUTER SYSTEMS LIMITED, P.O. BOX 74, BRENTWOOD, ESSEX CM1 1EY

**LINSCOTT**  
Computer Systems Limited

We also have many permanent positions which may be of interest to you. For further information about these contact Martin Walton at the above.  
Circle No. 28/4 2007

## TERMINAL OPERATOR

Applications are invited for this post within the Treasurer's Department  
The Council has an ICL 7803 Terminal linked to the Lancashire County Council ICL 2970 Computer  
The duties of the post would involve day-to-day operation of the Terminal, the running and development of computer systems and effective deputisation for the Corporate Liaison Officer  
Knowledge of computer operations and systems would be a decided advantage.  
Applications giving details of age, qualifications, experience, etc., together with the names and addresses of two referees, should be sent to the Chief Personnel and Management Services Officer, 280 Clifton Drive South, St. Anne's, Lancashire FY8 1UX. To be received not later than Wednesday, 21st May, 1979. Concessing will be decided.

## CONTRACT OPPORTUNITIES

SYSTEMS ANALYSTS - North-West  
PDP11 ASSEMBLER - Cheshire  
IBM PROG./ANALYST - Yorkshire  
To £300 per week

Tel. IAN BACON 081-941 1822

**GEMINI Recruitment**

Roberts House, 30 Manchester Road  
Altrincham WA14 6PL

## DERBYSHIRE CONSTABULARY

Applications are invited for the following post, based at Force Headquarters, Ripley.  
Derbyshire A job description is available.

## SYSTEMS ANALYST

The salary will be in accordance with the N.J.C. scale P.O.D.  
£15,415-16,030 plus £112 supplement  
The successful applicant will be required to form part of an existing Computer Project Team.  
He/she should have experience in the design and programming of real-time systems using mini computer hardware and should have a good working knowledge of at least one assembler and one high level language and experience of testing and resolution of problems at systems level.  
The successful applicant will be required, under the direction of the Project Manager, to assist in the evaluation, design and development of systems, hardware and control and information systems, from feasibility to implementation and maintenance, continuing system development and maintenance; also liaison with the local authority in connection with the design and development of police computers on their I.B.M. mainframes.  
A degree of appropriate professional qualification is desirable. Specially qualified disabled persons will be considered.  
Application forms may be obtained from the Chief Constable, Ripley Headquarters, Ripley, Derbyshire, and should be returned by Monday, 2nd April, 1979.

## BROOK MOTORS LTD

require a  
**Systems Analyst**

Our present IBM System handles the major Production Control and Commercial applications. We wish to develop systems to transfer these activities to a computer capable of Database and On Line applications.

An investigation into the use of Micro-Processors and Personal Computers is also being carried out.

Applicants should preferably have two years' experience in Systems Analysis on an IBM System 3, System 34, or equivalent. Experience of On Line systems would also be of advantage.

A competitive salary according to age and experience will be paid.

Forward written applications, giving career details to date and current salary, to:

Gordon Smith  
Training & Recruitment Manager  
EMPRESS WORKS, HUDDERSFIELD

## datascene international

## CONTRACTS PROGRAMMERS & ANALYSTS

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DUE TO OUR CONTINUALLY CHANGING REQUIREMENTS WE ARE ALWAYS INTERESTED IN HEARING FROM COMPUTER PROFESSIONALS WITH A SOLID D.P. BACKGROUND TO WORK WITH MAJOR CLIENTS WHO ARE ALWAYS ABLE TO OFFER A WIDE VARIETY OF INTERESTING & CHALLENGING REQUIREMENTS.

REMEMBER, WE PROVIDE TOP CONTRACTS  
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CALL **BOB EDWARDS**

TODAY

**Datascene International Ltd** 01-439 1856  
Scoughall House, 118-120 Regent Street, London W1B 1PB 24 hour answerphone  
Telex 45013

Ref 1154



## Lecturing/Consultancy- Lecturing/Consultancy- Computing Applications Computer Privacy & Security

To develop training resources, to be involved with course presentation and lecturing for training courses covering communications, management skills and systems techniques in the U.K. or to join an existing team for advisory and consultancy assignments for the application of computing in small companies, particularly first time users.

If you have a sound practical background in computing, experience in a consultancy role, or systems or programming in a commercial, manufacturing environment or of lecturing in the field of data-base on-line systems we shall be pleased to hear from you.

To join a successful team concerned with increasing the level of awareness of computer users to the consequences of a computer security breakdown and to transfer expertise and methods which have been developed to improve levels of safeguards.

Outlets will range from basic development work on various aspects of computer security, public speaking, development and presentation of education material.

on the topic of computer security work to consultancy work in the field of computer security and privacy.

We are looking for a sound practical computing background plus, either, experience of educational course development and presentation, or, an expertise in computing allied to consultancy, experience in a management consultancy environment or with an external audit firm.

## SEEKING A CAREER CHANGE? WHY NOT NCC?

The National Computing Centre have vacancies in Manchester for creative computer professionals who

are seeking a career change and who feel they can make a positive contribution to Centre projects.

### Development & Computing Practice

#### Methods

We are looking for sound practical experience of current data processing with a special interest for system design and/or programming and/or OP management. Ideally, candidates will want to contribute towards developing aids for those who work with computers.

#### Database

We are looking for knowledge of current DATABASE application practice. Quite a strong involvement in studies aimed at improving the state of the art on a European basis.

### Distributed Computing

Have you the ability to help others implement Distributed Systems?

Have you a good appreciation of the developments and trends in computing?

Can you make an evaluation of Network Architectures?

Have you written software for mini-based systems?

Have you been involved in the selection and implementation of equipment and software for systems using data communications facilities?

If any of this sounds like YOU we have an interesting range of projects evaluating the developments which are taking place in Distributed Computing to provide guidance to User Organisations.

**NCC**  
The National Computing Centre

## Programming Support Staff

£7000-£8000 Middy

Required to complete a newly started Project Team, whose responsibility will be the development and installation of a distributed communications based data collection system, linked to a centralised main frame, system encompassing sales, stock, purchasing and management information.

Applicants should have 3 years COBOL experience on library, an aptitude for fast and efficient problem solving and be prepared to work in a demanding Project Team environment.

In addition to the salaries quoted above, the Company offers the following benefits: Free life assurance, contributory pension scheme, subsidised BUPA membership, excellent free lunches and relocation assistance where appropriate.

Please write or telephone with personal and career details to: Position Number AEP 164, Austin Knight Limited, 66a High Street, Egham, Surrey, TW20 0EY. Telephone Egham 7091.

Applications are forwarded to the client concerned, therefore companies in which you are not interested should be listed in a covering letter to the Position Number Supervisor.

AK ADVERTISING

# MYRIAD

## NEW IBM INSTALLATION ANALYST/PROGRAMMERS AND PROGRAMMERS

N.W. LONDON

c £7500

These positions offer positive career prospects to ANALYST/PROGRAMMERS and PROGRAMMERS seeking a greater challenge, more advanced technical experience and additional responsibility. The company has just made a major hardware enhancement, in the form of an IBM SYSTEM/3 15D with 256K memory and over 500MB of Disk Storage, to assist with the Group's expansion program throughout Europe and U.K.

Working with a small specialist team, the successful candidates should have gained a knowledge of RPG II and have a good understanding of CCP. Training will be given where necessary. Every opportunity is given for members of the team to broaden their experience on unusual applications using the latest techniques and equipment (e.g. Microprocessors and Data Capture Terminals). A

major onslaught into on-line applications is currently being planned and will mean the implementation of VDU's around the Head Office building and Warehouse complex.

The company's Head Office is located in North West London from which its retail activities throughout the U.K. and Europe are controlled. Involved in its own product design and manufacture, the company has an outstanding record of successful expansion in recent years and can offer a challenging and progressive future. In addition to first-class conditions of employment these positions are enhanced by a pension scheme, discount on the company's products and a subsidised canteen, together with an excellent sterling salary.

Ref: AW1/0803

MYRIAD APPOINTMENTS LIMITED  
30 Fleet Street London EC4Y 1AA  
01-353 0981 24 HRS.

## Opportunities in Computer based training Stevenage, Herts

We are looking for project staff to join our small team working at the forefront of training technology. This group of specialists produces integrated multi-media computer based training for people in a range of company activities eg. Management, Sales, Spares, Engineering, System Analysis, and Personnel. Great care is taken in measuring the effectiveness of this training. Two types of program needed.

### Training Design Staff c£6000

You should have experience in the development of individualised training and an interest in all forms of CAI and CMI including simulation. An interest in high level language program design will be an advantage. Ref: D1268 A

### Programming Staff c£5500

This is an opportunity to broaden your experience in areas such as computer graphics, computer animation and computer aided instruction and design. We are looking for a proven ability in high level language programming and experience in program design. You must be capable of training and giving presentations. Ref: D1268/B

In both areas we are looking for good communication skills both written and verbal, and an ability to get on with people. In addition to the salary, you will be eligible to participate in our 1979 Productivity Bonus Scheme.

If you are interested write with details of yourself and your career, quoting the appropriate reference, to Mr. A. E. Turner at the address on the coupon. Alternatively post the coupon for an application form.

To: Mr. A. E. Turner, CED Recruitment, ICI, Cavendish Road, Stevenage, Herts, SG1 2DY.

I am interested in your computer based training opportunities, please send me an application form.

Name \_\_\_\_\_

Address \_\_\_\_\_

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Ref: CW1280

## International Computers

Think computers - think ICL



## Data Processing Manager

N.E. London £6,500-£7,500

Our client, an established engineering company engaged in the manufacture of industrial products and 23 offices throughout the country, is seeking a Data Processing Manager.

Reporting to the Financial Director, the post is responsible for the day-to-day effectiveness of the Data Processing services and their expansion within the organisation. In addition he/she will be required to advise upon the upgrading of hardware to cope with future demands and be completely conversant with the IBM System 3 computer and the programming language RPG II.

Candidates aged 28-40 will have a minimum of 3 years Data Processing experience, latterly as assistant or deputy. This experience should include the operation of manufacturing systems and ideally systems applied in field labour control.

This appointment is open to both male and female candidates who should send adequate particulars, initially, in confidence, to Peter Lee-Hale, Personnel Services Division of:-

Spicer and Pegler  
Management Consultants,  
3 Davis Marks,  
London EC3A 7HL.

A career opportunity  
with a major Region of  
today's energy industry

## ASSISTANT COMPUTER AUDIT MANAGER

Cheshire - up to £8157

Our Computer Audit Department is looking for someone with a high level of technical expertise in the realms of Programming, Operations and Data Control to join our data processing team at Regional Headquarters in Altrincham.

Reporting to the Regional Audit Manager you will supervise a small unit during completion of the computer Audit plan, and whilst some knowledge of Audit procedures would be an advantage it is not essential as training can be given in Auditing techniques. An ability to communicate effectively at all levels of management, particularly with specialist computer personnel both verbally and in writing is essential.

Our installation which is currently in a transitional stage comprises two ICL 470's one ICL 2860 and one ICL 2872 and experience of these or any other ICL hardware would be particularly advantageous.

The benefits we offer are those you would normally expect from a large progressive organisation including excellent career prospects, five weeks holiday a year minimum, attractive pension scheme, generous relocation expenses where appropriate and a sterling salary within the range £6882-£8157 plus current self-financing productivity payment.

If you feel you have the qualities, experience and technical knowledge we are looking for then write or telephone for an application form and return it quoting reference 8218/A not later than 22 March 1979 to the Director of Personnel North West Gas, Welman House, Altrincham, Cheshire WA15 8AE. Tel: 061-928 6311 ext 493.

This post is open to both men and women

NORTH WEST GAS

## NEW SYSTEM, NEW OPPORTUNITIES...

### SYSTEM BACKGROUND

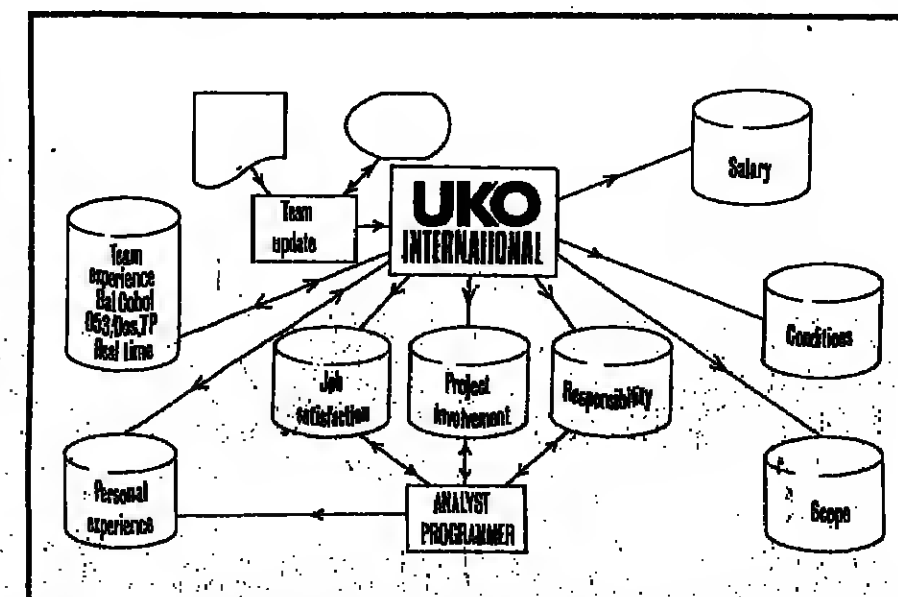
United Kingdom Optical is the country's largest manufacturer and distributor of lenses and frames in the British optical market. The Company also has interests overseas and enjoys a flourishing export trade. Since 1976 when the Group obtained a Univac series 90, a sophisticated real time order processing system has been developed and implemented. We are now seeking to expand our computer team before embarking on the Company's next phase of computer development.

### INPUT PREPARATION

We require analyst/programmers and experienced assembler programmers who feel they are ready to increase their areas of responsibility. We need people with a high level of self-motivation coupled with a desire and ability to become involved in all areas of system design and implementation.

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The current workload encompasses a variety of financial and medical applications which is processed on an ICL 2904 computer.

Applicants should have at least three years' relevant experience and be conversant with ICL Cobol and software. A knowledge of French would be an advantage.

Application forms and further particulars may be obtained from and should be returned to the Personnel Officer, Highland Health Board, 17 High Wycombe Road, Inverness, not later than March 9, 1979.

## ANALYST-PROGRAMMER £6,000-£7,000 (City)

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Applicants should have experience in RPG II programming preferably with IBM machines. A knowledge of systems and data processing will be an advantage although not essential at this stage.

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# Outstanding Opportunities in Surrey

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The Data Processing Centre provides a Bureau Service to the company's  
operating sites throughout the United Kingdom. The service operates a really  
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plans to implement a Data Base.

Current equipment includes an ICL 1902T with a Digico Front-End Processor,  
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a sophisticated On-Line Data Capture System and a PDP 11/34 used by  
the Redland technical division.

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To undertake feasibility studies, analysis, design and  
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Analysts are expected to have a thorough background  
and experience in all aspects of development projects,  
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where necessary. The Systems Department is involved in  
a significant amount of user contact and the Analysts  
become involved in training user staff. Experience in  
Communications, Data Base and/or Distributed  
Processing would be an advantage.  
Ref. 2292/CW.

## Senior Programmers

With at least 3 years' experience of commercial  
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should have the ability to write program specifications  
from a systems specification, plan program structures and  
supervise the work of less experienced programming  
personnel. A prerequisite is a thorough understanding of  
project control and the ability to deliver tested programs  
on time and on budget.  
Ref. 2293/CW

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With at least 18 months' experience in a high level  
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tested and documented programs efficiently and under  
minimal supervision.  
Ref. 2294/CW.

## Software Programmers

With at least 3 years' programming experience of  
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software and write in-house software to meet specific  
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Ref. 2295/CW.

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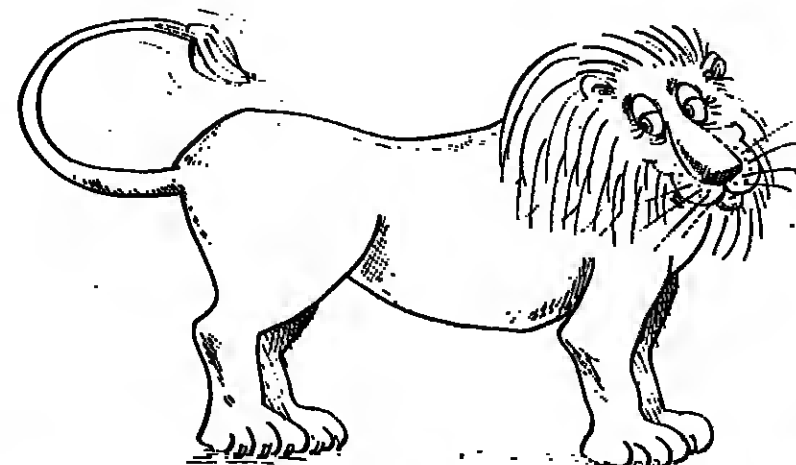
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A minimum of two years database experience preferably using IDMS or a similar CODASYL based system on large or small machines is required.

Consideration would be given and any necessary training provided to suitable candidates with other DB experience.

The appointments will all be based in Dataskil's European Organisation headquarters in Reading. Successful candidates will have frequent

opportunities to travel and work on interesting projects in Europe. Typical activities will range from pre and post sales consultancy through systems

development to project management. The assignments will be of varying length and will involve either short or long stints from the UK.



In addition to database experience applicants should have one or more of the following qualities:

- ambition, requiring a planned career path leading to line management or top level consultancy
- self motivation
- knowledge of, or keenness to learn, a foreign language
- enthusiasm to travel
- good customer presence

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### UNIVERSITY OF KENT AT CANTERBURY COMPUTING LABORATORY

#### Lecturer in Data Processing

The duties of the lecturer will be to teach and conduct research in data processing, covering such areas as systems analysis and design, computer-based management modelling and data bases. It will also be necessary to supervise student projects. Candidates may have a research and/or an industrial background.

The post is available from 1 October, 1979. The current salary range (under review) is £11111-£17754.

Application forms and further particulars may be obtained from R. R. Clayton, Senior Assistant Registrar, The Registry, The University, Canterbury, Kent CT2 7NZ (Telephone Canterbury 68332 Ext. 283) quoting reference A18/79. The closing date is 31 March, 1979.

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Successful applicants will join the small team responsible for installing the PDP-11, and, liaising with other UNIX users. It will be necessary to set up a library of useful additions and provide a documentation system to facilitate the interchange of information between the various groups. As part of the programme, the PDP-11 will be linked to a network, using X25 protocols. Experience with operating systems, especially UNIX, graphics or networks will be an advantage.

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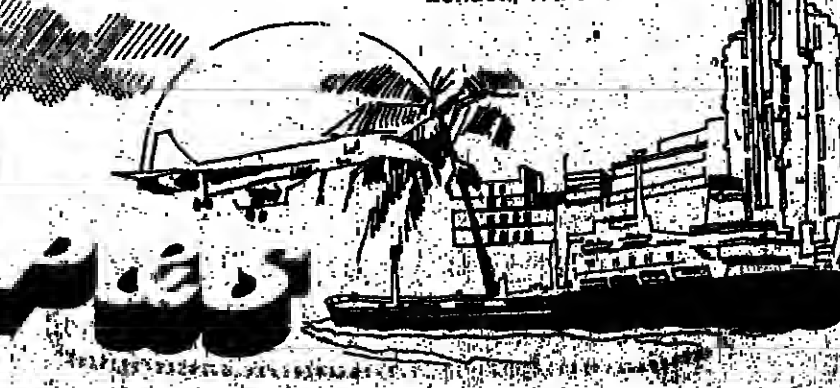
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### LANCHESTER POLYTECHNIC AT COVENTRY COMPUTER CENTRE

Due to the expansion of the Computer Centre and in order to prepare for the replacement of the current ICL 1903S computer there are vacancies for **3 CHIEF PROGRAMMERS** (Applications) (Systems) (Languages) £5,727 to £6,342 OR £6,060 to £6,792 OR £6,513 to £7,230 THE JOB: These three posts are the most senior programming appointments in the Computer Centre and between them they will be responsible for the work of all other system programmers.

**REQUIRED:** For all three posts, must have an honours degree or graduate equivalent status in mathematics, computer science or other relevant discipline. Must have at least five years' postgraduate experience including three years' experience as a senior programmer. Applicants should be full members of a relevant professional organisation such as the British Computer Society.

For application form and job specification please apply in writing enclosing a large stamped and addressed envelope to the Personnel Officer, Lanchester Polytechnic, Priory Street, Coventry CV1 5EL, returnable by 21st March 1979.

### BUNDESLAND POLYTECHNIC DEPARTMENT OF MATHEMATICS AND COMPUTER STUDIES

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## THE SALES AND MARKETING BIT

### Write your report during the call

ONE of the worst things a salesman can do is to rely on his memory. I guess that also applies in most other people in business.

If a salesman operates on the basis of assuming or accepting he has a huge memory and caters for such inadequacy accordingly, he is halfway to remembering everything.

The call report is probably the area where the salesman tends to leave most events and actions to memory, yet this is the aspect of his activity where it is essential that an observation or promise of action be taken before forgotten.

How many salesmen do you know who write out most of their call reports on a week, say, on a Friday night or a Monday morning, and only then because their manager collects them on a weekly basis?

This is pathetic, with nothing to recommend it. Firstly, it makes a significant task out of what could be a trivial exercise. Secondly, it relies on the human memory which, as a recording device, tends to concentrate on "highs" and "lows" with an overlay of random amnesia.

Thirdly, it potentially delays the initiation of actions to be taken by up to a week. Fourthly, call reports can be overlooked altogether, creating a picture of sales activity which is less than actual performance. The best place to write out a call report is during the call. A client will never object to a salesman's request to take notes during a meeting.

After all, such an action is a confirmation of the salesman's desire to do a thorough job.

A call report produced during the sales call is more likely to contain every noteworthy item, be it purely a recorded fact or a promise to take action. A call report created directly after the call, maybe sitting in the car, is certainly preferable to the once-a-week fiasco, but is much less reliable than the dynamic response of the in-call report.

Show me a salesman who produces his call reports on an ad-hoc basis and I'll show you an inefficient salesman who probably has to fiddle his expenses. Think about it!

### TRADER

P.S. If you have any problem or item of interest related to sales and marketing matters which you would like to discuss through this column or privately, please write to: Trader, Computer Weekly, Dorset House, Stamford Street, London, SE1 9LU.

## BOOK REVIEW

### 6800 is fun machine

Using the 6800 micro-processor, by Elmer Poe, Prentice Hall International, 68 Wood Lane End, Hemel Hempstead, HP2 4RG. £5.05.

IN his preface the author states that the "6800 is a fun machine, so read on and enjoy". This is the way in which he treats the subject and the result is successful.

Poe's experience as a technical instructor is evident in the well judged pace at which information is presented to the reader.

The book is written as a quasi self-instruction manual; although to use it as such, the reader requires access to some form of 6800 program development system.

Since the object of the book is to teach the use of the 6800 it is reasonable to assume that a development system would be available.

Poe makes no assumptions about the reader's previous knowledge of the 6800 or of microprocessors in general. He develops the early part of the book to establishing basic programming "procedures" and machine functions.

Unfortunately, he has made the possibly confusing mistake of the chapter "X" to represent the sum in fact 124 483.

### Puzzle Answer

THE fact that the second row has only two figures in it gives a strong hint as to their identity. Both 10 and 11 are ruled out by the conditions of the problem, which leaves 12 as the most likely alternative. A child would normally use a two-line calculation if anything greater than 12 were involved. This makes the left-hand digit in the answer 6, and the fact is not too difficult to see. The sum is in fact 124 483.

John Rice 12/79



## A unique position in TIMESHARING BASED IN COVENTRY

We doubt whether there are many positions such as this being offered in the D.P. business.

BL Cars is so large — its various operating companies so widespread — and its range of systems services so comprehensive — that it is questionable whether BL management is as yet fully aware of just how timesharing services can solve their day-to-day problems.

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So how qualified must our Specialist be? First and foremost we think you will have good technical knowledge of timesharing services coupled with a broad business background. The ability to communicate at a Senior Management level will be a decided advantage.

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Applications forms and further details may be obtained from West Yorkshire Metropolitan County Council Directorate of Planning, Engineering and Transportation, Room 238, County Hall, Wakefield to be returned by 28th March, 1979.

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LECTURER IN

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Applications are invited for the above post from candidates possessing a good Honours Degree who have had undergraduate research or had industrial experience in the application of computers to Information Systems.

The successful candidate will be expected to undertake teaching in this area at both undergraduate and postgraduate level and will also be expected to initiate research.

Duties to commence as soon as possible. Initial salary with the range £3,882-£5,531 p.a. Superannuation.

Further particulars and application forms (returnable by March 30th) from the Registrar, The University, Manchester, M13 9PL.



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Applicants will be invited to look through client register which details the companies, positions, salaries, prospects, etc., so that we can jointly choose the vacancies best suited to your requirements and experience.

## Ascii through the Logic Gate

An epic in 32K words, by Richard Forsyth

Block 29 (Blockade Running)

While Cleo's misadventures are proceeding apace, Hex is still at Fort Ranfour preparing to savour the fruits of his crushing victory over the electronic chess machine.

THE DPM's synthetic voice almost choked when he was compelled to adjudicate a draw, making Hex the winner of the series by 1½ points to ½.

"You think yourself extremely clever," he said, "but your play was suboptimal throughout. It would have beaten a better quality player. Its mistake lay in treating you as a worthy opponent."

"Nonsense," Hex retorted. "Don't make excuses. I beat it fair and square."

The chess trolley rolled mutely into its cupboard, and out of sight. An army of analysts and programmers would now descend upon it, Hex presumed, leaving little of its original mechanism unscathed.

"It's back to the coding pen for you," he added with gusto.

"And for you, I think," replied the DPM, "provided that you pass one further aptitude test."

"What is this?" demanded Hex, "continuous assessment?"

"I thought the chess tournament was the end of it."

"Just one more little question to answer. Then you will be deemed fit to participate in the greatest software development project ever undertaken. It sounds simple; but some of the greatest minds of our age have wrestled with it in vain. What goes backwards and forwards, sounds like a bicycle and never stops?"

"Oh, that's easy," replied Hex in a flash. "A Turing machine. It moves back and forth over its input tape; it sounds like a 'touring machine'; and, as for not stopping, the Halting Problem is well known to be insoluble."

"Good," said the DPM, less piqued by Hex's demolition of the riddle than over the loss by his chess protégé. "Now that you have satisfied the entrance requirements, I shall tell you what you are to do. You will be co-opted to work with Dr Mike Rose, formerly of the Main-Physical Laboratory, now director of the Advanced Systems Group, on the Future System Project. He is basically a biologist — a bit out of his depth when it comes to software. He needs a helping hand putting the finishing touches to BOSS (Bionic Operating System Supervisor)."



"What makes you so sure I'm willing to do it?" queried Hex.

"Two good reasons. One: you will be archived if you refuse. Two: you will be getting hands-on experience of the largest and fastest purpose-built holonole processor in the entire world. Furthermore, you will have it to yourself much of the time. We know full well you are unable to resist a prospect like that."

"Holonic?" muttered Hex uncertainly. It sounded enticing.

"Yes, holonic, with polypractic bisociative memories. Dr Null was not the only one to know of these things. Your experience with similar hardware will prove most useful."

"Why should you trust my loyalty?" Hex asked.

"Rest assured. We will keep an eye on you. One false step and you will go back to Fort Ranfour. I am told he is itching to get his hands on you."

"But I've already tried to attack the System."

"That is the point. You were chosen for that reason. Slavish obedience is no good to us. Your task is precisely to destroy the System — in the most constructive possible way, by building a better one. Do you not realize that the